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EDITORIAL NOTES.

The Institution Meeting—Headquarters for Gas Organizations.

NOT one of the members of the Institution of Gas Engineers who specially journeyed to London for the much abbreviated annual meeting last Tuesday—a meeting spread over rather less than three hours—will have regretted that he did so; for the proceedings, though destitute of any technical papers, were full of interest, and may be the means of giving spur to matters of importance to the industry in more than one direction. Gratifying it must have been to the President (Mr. John Bond) and the Council that there was such an excellent attendance of members, in view of the times, and the dwarfed character of the programme. But in this period of pressure and strange and critical happenings, the members of the gas profession, with their large responsibilities, local and (more than ever now) national, are glad enough of the opportunity for even brief personal touch with colleagues for mutually beneficial conference. The meeting gave just this opportunity; and the war conditions supplied topics for discussion—among others coal supply, recruiting from gas-works (which have already been heavily drawn upon), and the giving to workers who must of necessity stay at-home to keep the wheels going some outward and visible sign that they are engaged upon public work, and that their services cannot be dispensed with. These and other subjects were discussed—some in the very thoughtful and appropriate Presidential Address of Mr. Bond, and some by the members generally.

The President filled his part with dignity and courtesy; and all he had to say was essential. The members would, under the circumstances of the year, have preferred more of Mr. Bond as President; and, if he could only have been persuaded to remain in office a second year, Mr. John Young (the new President) and Mr. A. E. Broadberry, now the Senior Vice-President, and Mr. Samuel Glover, now the Junior Vice-President, would one and all have gladly seen another year pass before moving into, or nearer to, the presidential chair. But the choice for the President was between the continuing of the occupation of the pleasant position of honour in professional organization and the dedicating of all the time that can possibly be spared to the national work to which he has been called in connection with the High Explosives Committee. The claims of national work rightly prevailed; only those claims could have liberated him from the occupancy of the presidential chair for another year. In the work on which he is engaged, which is remunerated only by the knowledge of having done one's duty, all wish Mr. Bond and those with whom in it he is associated a rich success. However, he has a good presidential successor in Mr. John Young, in whose ears must, throughout the year during which he will be head of the Institution, ring those cheers with which the announcement of his election to, and acceptance of, the office was greeted. In these cheers were both encouragement and sympathy.

The short address which, amid pressing engagements, the President had been able to prepare, and which was of quite sufficient length for this meeting, covered much ground. Its main points are brought out in the "Review of the "Proceedings," and comment on them here is unnecessary. However, there was one generous action of the President which, with various remarks made by him during the proceedings, showed that the scheme for the provision of a home for the Institution and for cognate gas societies is one that lies very near his heart. The Building Fund, which a year ago was started by the Council allocating £500 for the purpose of a nucleus, has remained at that sum; but Mr. Bond has now caused it to swell by liberally subscribing to it 100 guineas from his own purse. What the President hopes to see in time is not an amalgamation of the societies working for the industry in different spheres, and the organization and effectiveness of which would only be impaired by fusion, but a building in which each Society could have its own suite of offices, and a hall which could be used for their meetings. A joint enterprise of the kind would be more feasible than one in which the Institution was alone. We have always envied those professional bodies and industries that have a central (so to speak) official home. Such a place, there can be no denying, adds dignity to an industry and profession, and inures to an expansion of usefulness.

Probably the recent conference, on the subject of coal, with the electrical industry in their "home" on the Thames Embankment has strengthened the desire for something of the same kind for the gas industry; for undoubtedly the desire is growing. The gas industry has no head and front of the same kind. Buried away in labyrinthian premises in Victoria Street, Westminster, are the present offices of the Institution; and somewhere in the same street are the offices of the British Commercial Gas Association. The offices of the Society of British Gas Industries are in the City. The offices of the Gas Companies' Protection Association are elsewhere; and so are the quarters of the Sulphate of Ammonia Association and the London Coke Sales Committee. We believe the various organizations of the electrical industries have their separate offices; but when we recollect that the Institution of Electrical Engineers has a membership totalling to 6811—made up of 8 honorary members, 1528 members, 3480 associate members, 568 associates, 357 graduates, and 870 students—there is sufficient reason for the suggestion that it would be necessary for the organizations of the gas industry to unite their forces for the purpose of providing and maintaining a similar building. Otherwise, such an undertaking, we are afraid, without some benefactor generously endowed it, would permanently cripple the Institution. There can be no question that a concentration of the official headquarters of the industry would be a great convenience, would promote efficiency of work, would enable greater co-operation, and would end once and for all the nomadic condition that reigns with regard to meeting-places.

When, if ever, such a home is provided, it would give opportunities for much more extended work, and still more frequent meetings. For instance, it seems absurd that 360 days should separate the meetings of the Institution—especially in these times. There was the one-day meeting this last week. The programme was not by itself the thing that attracted some 170 or more members from all parts of the United Kingdom. It was as much as anything else the desire of the North and South and East and West to take advantage of an opportunity to chat over the exigencies of the times as they bear upon the gas industry. During the past few years, there have been many matters of importance to the gas industry over which, we are certain, more frequent conference would have been an excellent thing. Matters of the kind increase with time. The conditions are altogether different from those which existed even a decade ago; and it is high time that the old order of concentrated conference once a year, and then conference strictly confined by the rule of the *agenda*, was shaken off, and conferences adjusted in respect of greater frequency to the needs of the changed conditions. We are persuaded that a meeting hall for the industry, with its organizations officially located in rooms under the same roof, would soon bring about schemes for enlarging usefulness. Mr. Bond, too, would like to see such a building embodying research laboratories for the industry, in order to specially devote attention to economies which are pressingly necessary in view of the increased costs that have fallen upon the industry during the last decade, and which costs do not show signs of abatement. This, admittedly, is a bad time for expecting any substantial progress to be made in the cause of an undertaking that will cost a very considerable sum of money; but it does not cost anything whatever the times to talk about an excellent piece of industrial enterprise, and to get people interested in it.

Recruiting and Public and National Service.

One of the subjects of present-day urgency which was discussed at some length at the meeting was that of recruiting. Loyalty and valiancy, and the desire to have a "turn" at the common enemy of peace and liberty, are at such a high level among British gas workers that there is some difficulty in restraining enlistment within the limits necessary to the protection of public service—public service which includes the provision of fundamental materials for the production of munitions of war, and the supply of light, heat, and power for other factories now engaged on the manufacture of war necessaries. There are also on gas-works many processes for which skilled workers are required, and for which men picked up at the street corner—and men must be loafers who can be found unemployed at the street corner to-day—are of no earthly good. Such skilled workers, in view of the response to the call to arms, cannot now be obtained, nor can gas undertakings possessing such men afford to part with them to other concerns which have lost theirs.

The complaint that is made is that there is no rule in existence regarding gas workers that is universally applied by those engaged in recruiting. This is a pity. It did go forth that no further recruits were to be taken from the skilled workers of such public services as gas supply, without the consent of the chief engineer or manager. Whether or not this order had been promulgated among all the recruiting depots throughout the country is not positively known. The statement made in Major Gosset's letter in the "Journal" for Dec. 22 (p. 652) that it had been, rather conflicts with the assertions on the subject of certain recruiting officers. If, however, the instruction has been circulated, it is not universally observed; and, moreover, some of the subordinate recruiting officers are found to be men of subtle resource. Orders of the kind are no bar to them. More than one member at the meeting related how, when he had refused consent to a man enlisting—refusal only made when the man could ill be spared—the recruiting officers have advised such men to get over the difficulty of consent by giving a week's notice to leave their employ. It is a serious point, and, as in the matter of coal supply, there ought to be some real protection for gas undertakings and their work, both on public and national grounds. It cannot be said that the gas industry has not done a good part in furnishing men for the Army and Navy; indeed, we doubt if there is another industry that can show a larger proportion of its employees serving with the Colours. But especially in the small undertakings, and in connection with the men on special work in the larger ones, the limit has been reached, and the factor of safety for some has, we know, already been reduced to quite dangerous limits.

During the discussion of this matter, there was much said as to the need for a medal or badge which should publicly denote that the wearer is detained at home on public service. But such medals or badges are of no intrinsic value, unless they have upon them some indication of their issue having been sanctioned by the War Office or Admiralty. This is a matter which the President promised to bring to the notice of the War Office; and Mr. Bond's association with the High Explosives Committee gives him excellent opportunity of doing this. It is to be hoped that something beneficial will result.

Coal Price Rise and the "Causes."

To-morrow is the day for informing members of Parliament of certain things that they ought to know regarding the supply and distribution of coal to the gas and electrical industries, the question of prices, and the possible effect upon the people of the country, upon industries, and upon the output of munitions of war, if there is any shortage of coal for the production of gas and electricity. It is hoped that well before this all managers of gas undertakings have urged their local representatives in Parliament to be present at the conference. But there is one thing that may be most devoutly hoped; and it is that among the speakers who address the members of Parliament, Mr. Edward Allen will not be included, if his remarks are to follow the lines of those he made at the meeting of the Institution last Tuesday. Had there been, he said in effect, a round-table conference with the coalowners last January, the increase in price would have only been some 2s. 6d. per ton, instead of 5s. or 6s.; if the London and Southern gas undertakings had not rushed to Lancashire, Yorkshire, and the Midlands in their extremity for coal a few months ago, the markets would not have been disturbed, and the price would not have taken its rapid upward flight. We are not sure which of the two causes—the aloofness of the gas industry from the coalowners last January, or the rushing into the markets by the gas undertakings depending upon seaborne coal—is supposed to have had the greater effect in raising prices to current level. Anyway those are the views of Mr. Allen; and we should like to know who among the coalowners has been hypnotizing him, or by what means the coalowners have succeeded in proselytizing him to such an extent that he turns on the gas industry the blame for high prices.

This is the first time that we have heard of any desire on the part of the coalowners to parley with the gas industry through representatives on the subject of the prices they should charge undertakings, and the manner in which they should make their deliveries. The news is too good to be true. The secrecy with which this fervent desire has been jealously guarded makes us gravely doubt the *bona fides* of Mr. Allen's authority for saying this. If the coalowners wished for conference, why did they not openly say so? The conferences they did desire were held, and those were among themselves. As to the second point, that many undertakings in London and the South rushed in and bought coal in the open market wherever they could lay hands on it, they did not do this of their own free choice. They were compelled to it by the impossibllity of getting coal under their contracts from farther North. It was an emergency, and buying a matter of necessity for the purpose of keeping the supply of gas at full flow. Then why refer to the matter publicly, as though these undertakings deserve censure for something that could not be avoided. The excellent coalowners who, under the influence of a conference in January, would have been willing to limit the advance in price to 2s. 6d. per ton, have, we know from experience, wills of their own; and they could well have limited the increase, without conference, to 2s. 6d. had they chosen, instead of raising the price by 5s. or 6s. It is more than probable, too, that these same benevolent men will put yet more on, employing the excuse that the extra profit made per ton of coal is insufficient to meet the additional cost entailed by the war bonus, which war bonus is to be made the vehicle, by the best of showings, for more profit still. It is passing strange that these coalowners who would have been, according to Mr. Allen, quite content to agree to 2s. 6d. per ton advance in January are moved, on the slightest pretext, to look so well after their own pockets. But Mr. Allen appears to charge the gas industry with being the cause for the rise in price—first of all, through not having conferred with the coalowners early in the year, and, secondly, because some undertakings went into the open market and bought when mercilessly pressed for supplies. If Mr. Allen told these tales to members of Parliament to-morrow, and if they accepted his version as to the causes of the increased prices, they would naturally say that the gas industry had only themselves to blame for what had occurred as to prices distinct from supplies, and had neglected their opportunity for making more reasonable bargains.

However, the principal object Mr. Allen had in addressing the meeting on Tuesday was not to upbraid the London and Southern gas companies, and to chide the gas industry generally for not seeking out the coalowners in January last, and conferring with them (he hopes this will henceforward be done), but to move a resolution, expressing the pious hope that success would attend the efforts of the Council of the Institution in trying to induce the Government to move in the matters of promoting deliveries of coal and of causing the application of means for restraining the appetites of the coalowners for extraordinary profits. There is every reason —present as well as prospective—why the Government should lend a helping hand in these directions to both industries, especially to the gas industry, seeing that the greater the sale of gas can in the present be promoted, the larger will be the quantity of coal carbonized; and therefore the greater the production of toluol, disinfectants, and other things required in connection with the war. A high price of gas consequent upon the exorbitant cost of coal is a distinct deterrent to the maximum possible consumption of gas; and if there is short delivery of coal, well it is impossible to tell what will be the effect on the supply of gas not only to the general public, but to those factories engaged on Government work. The gas industry is helping the Government, said one speaker at the Institution meeting, and therefore the Government should help the gas industry in the matters of coal supplies and prices. If the Government look into the question of coal prices, they will find that the advances

are considerably more than are really warranted by increased costs alone.

There was questioning as to what the Council advised those concerns to do which had not yet entered into contracts for coal. They seem at the moment in rather an awkward plight; and their only hope is in the Government doing something to regulate prices. The position is this: Many large undertakings have already made contracts, and their chief concern is now not so much as to price, but as to getting hold of the coal, and putting a goodly proportion into store against winter contingencies. Then Mr. Robert Watson pointed out that some collieries with their reduced outputs have already entered into contracts that will "fill "the bill," and so have not any coal to spare. Between these conditions, the only hope for the undertakings which have yet to contract is in the Government. Otherwise, it is every man for himself; and, in matters of both prices and stock accumulations, unprecedented responsibility resides. Neither the Council of the Institution nor anyone else can advise a manager as to what he should do; in fact, never was there more thankless task than counselling to-day in respect of coal purchases. It is Mr. Allen's opinion that gas undertakings ought to associate themselves together for dealing from year to year with this question of coal supply and prices. This could not apply to the present year; it could only apply to the future. It is one of those matters, we are afraid, in which dealings cannot be made by any collective effort; though it is possible collective effort might devise something whereby coalowners would find it to their advantage to let competition and the laws of free trading come into play, rather than, as is now done, agree among themselves upon the minimum prices that shall rule for different classes of coal, and those minimum prices fixed more by the will of the coalowner than by the much-abused law of supply and demand.

Ventilation Research.

The Joint Committee on Ventilation Research of the Institution and of the Leeds University are going about their work (with Professor Arthur Smithells as chairman, Professor Cobb as research supervisor, and Mr. William Harrison, M.Sc., as research chemist) in a serious and methodical manner. The intrinsic value of the investigation will be directive through the establishment of principles; but as any positive guide, from the numerical standpoint in regard to rates of flow, &c., the results obtained will have no real applicability to ordinary conditions, seeing that the figures will be the result of investigation cloaked about with scientific exactitude and definite regulation. Of course, the only way to get reliable findings is to have all the conditions known; but this has its influence on results. For instance, regulated air admission into a space from which a burner or a gas-fire draws air into a flue must, in some measure, according to the degree of regulation, affect the quantity of air passing up the flue. In other words, the regulation of the air into the space, must, if it be on the low side, rob the flue of an accelerating influence. However, care should be taken not to misconstrue the figures given in the report, and not to misapply them in everyday circumstances. The practical result of the investigation will be, as we have said, in determining rules which can be used in obtaining the best ventilating efficiency by the aid of gas-burners and gas fires.

The first part of the second report presented at the meeting last Tuesday treats of the ventilating power of gas-burners; and the investigation establishes certain matters that, in a general way, are no doubt perfectly well known to our gas lighting and ventilating engineers, if not always applied as rules in their practice. The first thing is that a ring-burner gives a much more even distribution of temperature in a ventilating-flue, and produces a greater pressure-head, than a burner with a single flame, consuming an equal amount of gas, and producing a central hot column of air in the flue. In the later practice of gas lighting and ventilating engineers, the single burner, or central group of burners, of earlier times have been abandoned, and ring-burners have been adopted. Then we have it laid down that the upright incandescent burner has a higher ventilating efficiency than the inverted one. This is what one would have supposed. What, however, is surprising is that the figures show that the difference in ventilating power is so small between good inverted incandescent burners and upright ones. We say "good" because some inverted burners are worse than others in promoting ventilation. There is only a 1 or 2 per cent. difference shown in Table III. between the best inverted burners and the upright ones; but the difference expands to 6 or 7 per cent. with certain of the inverted burners. The difference, however, is really negligible. One has to remember that the functions of burners specially incorporated nowadays in ventilation systems are twofold—to illuminate, as well as to ventilate; and, from the elevated position of the ventilating-burners, a better distribution of light is obtainable with the inverted burner than with upright ones.

Another point is the situation of the burner in relation to the base of the flue; the position having an influence on the volume of air passed into the flue. The greater the volume of cooling air, the lower the head in the flue. This is extremely important, because while the temperature of the flue gases should be kept low—the same as in the case of the gas-fire—it is very necessary for the promotion of ventilation that a small head should be maintained in the flue. Every variation in flue, and every different set of conditions, has some effect upon the proper situation of the burners in relation to the base of the flue; and if the Committee can devise some simple method of determining the correct relative position, they will earn the gratitude of men engaged in the practical work of utilizing gas lighting in ventilation schemes. We are afraid there is in this connection at the present time an amount of guesswork; but guesswork or not, the ventilating results that are obtained testify to efficiency. Then where there is more than one ventilating point, it is desirable that there should be uniformity in them, and not such disparity that the stronger ventilating system overpowers the weaker one, and draws products from the latter. There should also be some proportion between the consumption of gas and the size of the flue; seeing that there is a consumption beyond which, in relation to the flue, it is disadvantageous to go.

So much for ventilating gas-burners. The work that has been done in connection with the ventilating effect of gas-fires is also good as indicative of principles rather than as affording any accurate determination of the ventilating power of gas-fires. There is no question whatever that just as the construction of different rooms, and the length and the capacity of the chimney, have an effect on ventilation, so the design of gas-fires has an effect upon the measure of their efficiency in promoting ventilation. But in connection with these particular tests as to the movement of air from the room to the flue, we do feel, having regard to the figures in the report, that the damper-like regulation of the air to the small test-room has played a part in the volume flow of air in the flue. The tests show that the ventilating capacity of gas-fires is increased (with the same consumption of gas) by the provision of auxiliary openings at the back of the fires. But care has to be taken that the auxiliary openings are smaller than the flue-vent (which latter, under any circumstances, should be of ample dimensions), or there will be a passing of products from the latter to the former. But though for sightliness, where ventilation is wanted *viâ* the gas-fire, an auxiliary opening at the back of the fire is an advantage, still the same additional ventilating effect can be obtained by setting a gas-fire a little distance from the front of the fire-place, so that the equivalent of the auxiliary opening is provided round the back edges of the gas-fire.

Birthday Honours.

Interesting to readers will be certain of the honours conferred by His Majesty the King on the occasion of his fiftieth birthday. Champion of gas interests in many a parliamentary fight, and upholder of the system of co-partnership of which he learned the benefits through his friend Sir George Livesey, Lord Robert Cecil, K.C., has been created a Privy Councillor. Among other new Privy Councillors is Mr. John Mackinnon Robertson, M.P., Parliamentary Secretary to the Board of Trade, who not long since, in the absence of the President of the Board of Trade, received the representatives of gas undertakings in the Manchester district in connection with the question of coal supplies. In the House, too, he has been officially very prominent in the matter of the national dye scheme. The name of Mr. E. A. Goulding, M.P., will henceforth appear on the report and balance-sheet of the Continental Union Gas Company as Sir E. A. Goulding, Bart. We are quite capable of not allowing differences of opinion and hostilities to stand in the way of sincerely congratulating Mr. William Pearce, who occupied a leading place in the attack in 1912 and since of the chemical manufacturers on the gas

industry, upon the knighthood which he has had bestowed upon him. A name well known to our Scotch readers is that of Mr. John Lindsay, the Town Clerk of Glasgow, whom many members of the Institution of Gas Engineers have had the pleasure of meeting. Upon him a knighthood has also been conferred. Water engineering friends will be gratified over the knighthood received by Mr. William Napier Shaw, F.R.S., whose meteorological work has been of immense value to them. Pleasure will be found in the recognition bestowed upon Mr. Ernest Moon, K.C., Speaker's Counsel, and who formerly did much work at the Parliamentary Bar in connection with the gas industry. He receives the distinction of an ordinary member of the civil division of the third class, or Companion, of the Order of the Bath.

Neighbourly Persuasion.

There can hardly be resistance to the appeal from one's neighbours for co-operation in a good cause, when they can show an excellent case and mutual benefits. Big things are done by the whittling-away process. Even a nation that has set itself the task of dominating and curtailing the liberties of the world may be brought to its right bearings by this process. In trading huge progress may be gradually made by persistent and well-directed educational work; and those who, by unfair means, try to stay the advance of an industry that can show economy and efficiency by extending patronage to it, can be stopped in the exercise of these means by proving, through suitable channels and in suitable ways, the futility of their proceedings. This work the British Commercial Gas Association have been doing, and are continuing to do, by the support of subscribers of the necessary funds. Were it not for this support, the work could not be carried on directly and indirectly—in the highways and the by-ways. There are still many undertakings, however, that do not support the Association. Various have been the attempts to urge them to join forces with the other concerns; and now District Membership Committees have been organized in the Manchester and Wales Districts, and other District Committees are in course of formation. These Committees are constituted of representatives of subscribing undertakings; and they are going to make direct appeal to their neighbours who are not subscribers. "Come and help us in the good work we have in hand," will be the simple message; and there cannot surely be refusal of the appeal of neighbours who can show that the expenditure they are making is benefiting the whole of the gas undertakings in the district, and, indeed, the industry throughout the United Kingdom. There is nothing better than this commercial propaganda work for consolidating the foundation of the interests of the entire gas industry. This is the point which has to be driven home among non-subscribing undertakings; and surely it can only be the mentally blind who cannot see the truth of this. The first meeting of a District Membership Committee is to be held to-morrow at the Blackburn Town Hall.

A Circular Inquiry from Huddersfield.

A few weeks ago, Mr. Harold Singleton, the former draughtsman and chemist of the Huddersfield Corporation Gas-Works, accepted the position of Gas Engineer and Manager, at the munificent salary of £250 a year; and the Gas Committee thereupon, with an eye to further economy, decided to advertise for a person to occupy the dual office of draughtsman and chemist at the salary of £100 a year, at which salary a retort-house machine-hand would not regard himself as over-paid. The Committee placed their own assessment upon the value of the services they expected to be rendered; and Mr. Singleton was evidently satisfied. Naturally, gas engineers do not look with favour upon proceedings which degrade their profession, nor upon those who assist in such degradation. And it has been Mr. Singleton's uncomfortable experience to be pointedly told this (as will be seen from letters in our "Correspondence" columns to-day), on his initial essay in securing information by that particularly obnoxious means—the inquiry-circular. The inquiry-circular grew at a very lively pace at one time, until it reached the dimensions of a perfect nuisance; and then there was an indignant outburst against it from the profession. Mr. Singleton may be strongly advised not to have anything to do with it again. Engineers and managers of capacity and experience do not care to have their time wasted in this way; and those who are reasonably paid for their services have their own views on both the inquiry-circular, and as to the duties for which they are paid—which duties do not include answering inquiry-circulars. It is true that Mr. Singleton's inquiries only refer to street lighting; but there are eleven of them—including questions as to automatic and torch lighting and extinguishing, wages, charges for lamps, and all sorts of details. Their answering would have taken time. Information has been published here and there on these various points; and if the inquirer has not followed up the data—he probably had no occasion to do so when he was not an official engineer and manager, and in all likelihood was not contemplating being one—that is his loss now that he is in his present position.

Profits and the Rates.

Not by any means—if memory serves correctly—for the first time, the members of the Stockport Town Council have been discussing the question of the allocation of surpluses on the gas undertaking to the relief of the rates. It is a controversy which, wherever it may be raised, seldom fails to reveal sharp differences of opinion; and the peculiar circumstances of the moment no doubt tend to the manifestation just now of even stronger feelings than usual on the subject. The majority of people—gas consumers and non-consumers alike—are suffering from the economic disturbance, and are therefore really in equal need of consideration. It must, of course, seem a very pleasant proposition to the non-consumer of gas that his rates should be kept down to some extent through the "profits" made by the municipal undertaking out of his fellow ratepayers who do use gas. But the gas consumer sees the matter in an altogether different light; and looking at what there is to be said on both sides, it does seem he has very much the best of the argument. There are heavy additions to be met in the way of manufacturing charges; and increases in the price of gas are the rule rather than the exception. Where, however, a sum out of profits has to go to the relief of the rates, it is obvious that the increase in the charge for gas must be, by just so much, more than would otherwise have been necessary. Why should the consumer pay this extra? Because, we learn, the ratepayers take a risk—"if the works became obsolete next year or the year after, the ratepayers had to bear the loss." One would like to have an actuarial opinion as to a fair charge to place upon the risk of an efficiently maintained gas undertaking like that at Stockport becoming obsolete next year or the year after. It could not be considered strange if the gas consumers should think they are doing enough for the general body of ratepayers by paying off for them the borrowed money which these ratepayers are supposed to have invested in the undertaking.

Smaller Contributions.

It will be noticed that in the case of Stockport, to whose discussion on the question of gas profits reference has just been made, the statement was made that the amount which it is proposed to give in aid of the rates is less than in the previous year. The same remark applies to Birmingham, where very similar arguments to those heard at Stockport were raised in connection with a proposal to further increase the price of gas. The Birmingham gas undertaking has been, and still is, enjoying a period of great prosperity, so far as the consumption of their main commodity is concerned. But here, as elsewhere, residuals have realized less, in spite of a largely increased amount of coal carbonized, while the prices of coal and oil are increasing, and other additional charges have to be borne. The increased price of gas which was agreed to at last week's meeting of the Council will provide for the rates a sum that is extremely modest, when compared with allocations made in previous years. Still it is impossible not to recognize the soundness of one of the speaker's argument, that it is not a good policy to use the trading concerns as a means of indirect taxation at any time, and in the present instance it should be remembered that those who pay for the gas include thousands of working people and small tradesmen who are hit very hard just now. On the other side, there is the plea for a fair return on the capital invested in the undertaking, though this point was not carried to its logical conclusion by an explanation to the Council as to who exactly it is that finds this capital. If it is the ratepayers, as such, who provide interest and sinking fund charges on the borrowed money, the justice of their claim to a return on the investment cannot be gainsaid. On the other hand, if it is the gas consumers who make these capital repayments, does the same argument apply?

THE INSTITUTION OF GAS ENGINEERS.

PROCEEDINGS AT THE FIFTY-SECOND ANNUAL MEETING,

HELD AT

THE INSTITUTION OF CIVIL ENGINEERS, LONDON,

JUNE 1, 1915.

President: Mr. JOHN BOND,

Engineer and Manager of the Southport Corporation Gas Department.

REVIEW OF THE PROCEEDINGS.

[For full Report see p. 566.]

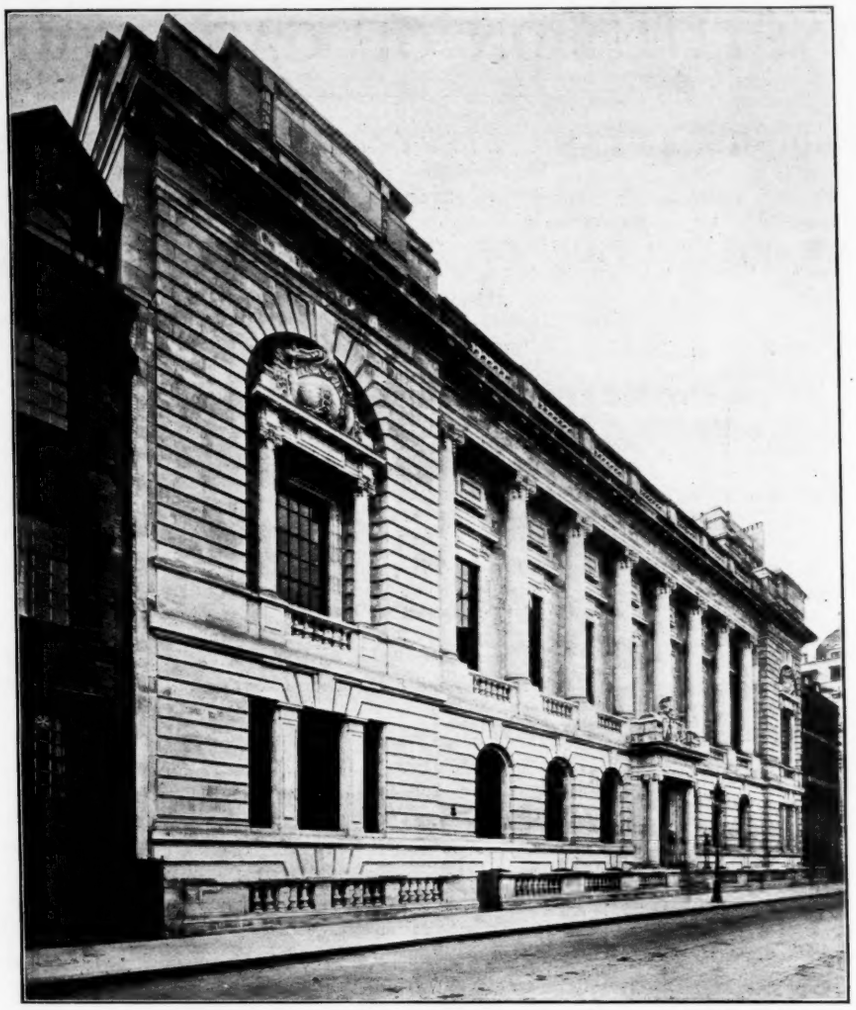
A HALF-DAY meeting, or a half-day and a bit (if the afternoon meeting of the Benevolent Fund subscribers is included) was what the Council of the Institution allocated to the annual proceedings this year, in the exceptional circumstances of the world's upheaval through the conflict of many nations. Now that the meeting has been held, it is difficult to know whether or not to congratulate the Council on its drastic shortening. But, on the whole, perhaps it was better so, as while it enabled the members to transact the business of the Institution, listen to an address by the President touching current gas politics, and hear an instructive report, it also gave them the opportunity required for personal conference. It is not the duty of gas engineers and managers to be long absent from home just now, with the extra work thrown upon them through the military service of many of their men, with the national work that a great number of them are engaged upon, and above all with the critical position of affairs in regard to coal. What the Council can be congratulated upon is the excellent (under the circumstances) attendance of members from far North and far South, from far East and far West, and from the intervening territory. Roughly speaking, some 170 members signed the register; but this number does not seem to include quite all who occupied the well-filled benches of the large hall in the handsome new building of the Institution of Civil Engineers, at the corner of Great George Street and Princes Street—that is to say, on the side of the former street opposite to where the old premises of the Institution stood, from which they were driven by the requirements of the Government in respect of office extension.

INSTITUTION OF CIVIL ENGINEERS—THE MAIN DOORWAY IN GREAT GEORGE STREET.

The New Building of the Civils.

Just a little digression. The Institution of Gas Engineers have in numerous years enjoyed the hospitality of the premier engineering Institution in their old building; but this is the first occasion on which the members have been privileged to occupy the large hall in the new premises, and generally to enjoy the conveniences offered by the well-planned building. It will not be out of place, therefore, to put on record a few particulars about it. It was designed by Mr. James Miller, F.R.I.B.A., and is in style a modern rendering of the later Renaissance. It is a building worthy of the importance and prestige which the Institution of Civil Engineers has attained. Occupying an area of some 21,000 square feet, on the ground floor are situated the Council and Committee rooms, the reading-rooms, and general offices. The first floor has been assigned chiefly to the lecture theatre, the great hall, and the main library; the apartments being arranged and connected together in a convenient manner for the reception of large numbers of people. Further library accommodation is afforded on the second floor, where also is a writing and smoking room for the members. Provision for the general service of the premises, including the heating and ventilating apparatus, extra cloakrooms, &c., and for storage, are made in the basement and on the third floor. This, in outline, is the accommodation afforded by the building; but its architectural glories we have not space to describe. The accompanying photographs, however, will give, though inadequately, some indication of them.

[For the photographs accompanying this review we are indebted to Mr. A. E. Walsham, No. 60, Doughty Street, W.C.]



THE FRONTAGE OF THE INSTITUTION OF CIVIL ENGINEERS BUILDING IN GREAT GEORGE STREET.

A Criticism of Lighting and Ventilation.

It was in the centrally domed great hall of the building that the members met. Around its walls hang the portraits in oils of a long succession of men who, by distinction in the engineering world and personal characteristics, have won the regard and the coveted Presidential Chair of the Institution of Civil Engineers. One criticism must be made of the lighting of the hall. With all the advances scored by illuminating engineers, the buildings of the technical institutions of London do not appear to have hit upon an efficient system of electric lighting. The whole of the ceiling of the large hall of the Civils is not a reflecting surface. The dome in the centre prevents it being so. The walls, too, have not good reflecting surfaces. Yet an indirect system of electric lighting has been adopted; the lamps being concealed in the cornices, and the reflected light only coming from a narrow belt of whitened coving round the sides. The results are that those whose eyesight suffers the effects of age or hard and constant work are not able to clearly read print which under other circumstances of lighting, would be quite distinct to them; and a man sitting at one end of the hall is hardly able to pick out the features of his most intimate friend a short distance from him. Something should be done to alter this condition. But when the Institution of Electrical Engineers have difficulty in finding in electric lighting a means of effectually illuminating their own hall, one cannot be too hard on the Institution of Civil Engineers for the indfferent lighting of their principal meeting-place. It was also remarked that, with the hall full, the ventilation was not so efficient as it should be. These criticisms are not made in any captious spirit, but rather in a friendly one, as this handsome building should not suffer defect in details, and the Civils can well afford to correct defects.

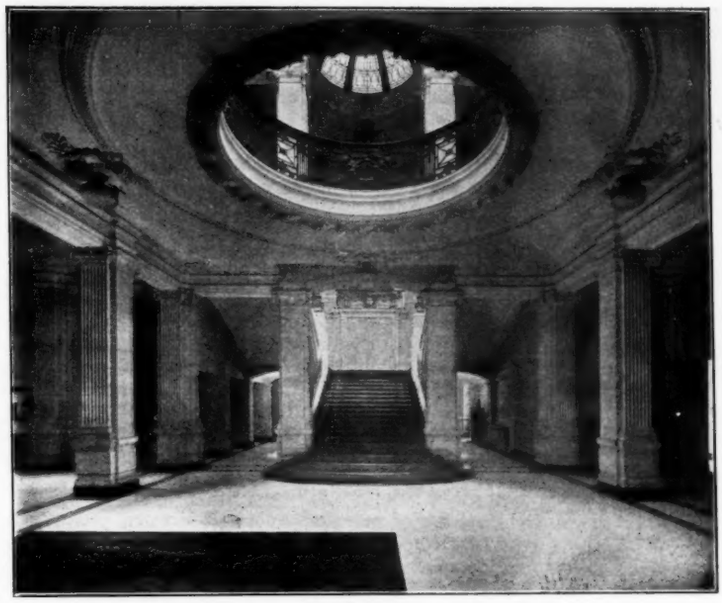
The Customary Foregathering.

However, things were much the same last Tuesday morning as they have been for fifty odd years of the history of the meetings of the Institution of Gas Engineers. When the mornings are fine—and it was a fine one last Tuesday—it is customary just before the hour of the opening of the proceedings to find little but animated knots of the members on the pavement outside the place of meeting, and in the vestibule and entrance hall, engaged in greetings and talking over the latest events—industrial and otherwise. Those who attended this unique annual meeting will not forget that the German assassinators, vandals, and destroyers of homes of innocent people had during the night made their first raid on London; and some of the visitors from the provinces confessed that they had been spending time before retiring for the night in looking for the aërial gasholders, but had failed in their quest. There was talk of the raid, of coal, of what was being done by the different works in aiding the Military Authorities, and there were members who were not a little bit sorry for themselves that the loyalty and valour of some of their best hands were driving them into a tight corner for efficient men in respect of special work and processes.

In Prominent Office; and the Entente Cordiale.

Gradually the great hall filled. There was the President (Mr. John Bond) already in the chair. There beside him was the Senior Vice-President (Mr. John Young), who was soon to hear of the determination of the members that from this meeting he should, for the space of one year—and a critical year too—be the President; there was the Junior Vice-President (Mr. A. E. Broadberry), who was soon to succeed to the Senior Vice-Presidency; there was Mr. Samuel Glover, who was later to fill the Junior Vice-Presidency. There was the energetic Hon. Secretary (Mr. W. E. Price), and the no less energetic Secretary (Mr. Walter T. Dunn). The members of the Council supported the President in good force. Looking round, were seen Professor J. W. Cobb, Livesey Professor at the Leeds University, the Chairman of the Society of British Gas Industries (Mr. Alderman F. Templer Depree), the ex-Chairman (Mr. J. W. Broadhead), and several of their colleagues on the Council

of the Society. The Chairman of the Executive of the British Commercial Gas Association (Mr. F. W. Goodenough) was also there. Every year the *entente cordiale* is extending in the gas industry. It was altogether, as has been said, a goodly and representative attendance of the gas industry for such a time and for such a short meeting.



THE ENTRANCE HALL.

Preliminary Business.

Punctually, the proceedings commenced. The minutes of the last annual meeting had the seal of approval put upon them; and Messrs. E. J. Brockway and Harold Baker were sent away to scrutinize the balloting papers. Then Mr. G. T. Purves was called up to receive the London Gold Medal for his paper last year dealing with the application of coke-ovens and the direct recovery of ammonia process to gas-works requirements. Endorsed by cheers, the President complimented Mr. Purves on being the first member of a junior organization to be the recipient of the London Gold Medal. Then came the turn of Mr. Jacques Abady to receive the award of the Institution Gold Medal for his last year's contribution on calorific power as a standard. There was a fervent expression of hope on the President's part that calorific power would soon be the universal standard for gas supply. This is not the first time Mr. Abady has had a medal for his contributions to the literature of the industry; and he seems to find some pleasure in the fact that the bestowal of medals by the Institution has not become such a frequent habit as the bestowal of iron crosses from another quarter. Mr. John West was unable to be present to take charge of the Silver Medal for his contribution; but the President undertook to safely convey it to Southport, and make the presentation at home. Mr. B. K. Schieldrop naturally found it inconvenient to travel from Norway to receive the Bronze Medal; but a letter from him expressed his gratitude for the honour conferred by the Council.

A Generous Donation to the Building Fund.

Last year it was the privilege of the then President (Mr. Edward Allen) to announce that the Council had allocated £500 as the nucleus of a fund for the building of a home for the Institution; but there does not appear to have been any supplementing of the fund by the Council during the past year. Cheering greeted an announcement which the Secretary (Mr. Walter Dunn) interposed, before the short address was delivered from the chair, to the effect that he had received from the President a cheque for 100 guineas as a contribution to the building fund. This will probably serve as a suggestion and a stimulus to others. There were several references to the subject of the "home" in the course of the proceedings. It was raised on the presentation of the report and accounts by Mr. E. A. Harman, who wants prominence given to it in the accounts by having it set out in a separate form, so as to attract notice. The idea of a building for the organizations of the gas industry is undoubtedly growing in favour. The other prominent technical institutions have their own permanent habitations, and why should not the status of the gas industry have the recognition of permanent headquarters? The President, towards the end of the proceedings, expressed the opinion that the Institution, the Society of British Gas Industries, the British Commercial Gas Association, and the Gas Companies Protection Association should all be housed under one roof, with separate suites of offices, and a hall which could be used by each Society. Although in one building, he is a believer in maintaining the organizations as distinctive bodies, for promoting the highest efficiency in the special work of each.

THE LANDING ON THE FIRST FLOOR BY THE LECTURE HALL.

The President's Address.

The text of the Presidential Address was published in the "JOURNAL" last week. It was brief; and it was to the point. Had this been an ordinary annual meeting, the President would have extended it by including an account of the research work that has been prosecuted in the laboratories of the Southport Gas Department. But events ruled otherwise; and so the President promises that particulars of the work shall at a future date be presented to the Institution in some other form. But the members of the gas profession will have to possess their souls in patience for this, until the President has completed his work in connection with the High Explosives Department of the War Office. In this national work is found the reason why Mr. Bond did not accept the honour the Council desired to confer upon him of the Presidential Chair for the second year.

The Industry a Universal Provider.

The address in one respect is a tantalizing production. It makes one feel that it is merely a taste of what we should have had had the times been normal, and the annual meeting on the ordinary lines. We heard of how the gas industry may be looked upon as one of the mainstays of the nation. The extraordinary medley of components which go to make up the "nation" has not known, and perhaps know very little now, of how much reliance there is to-day on the gas industry for providing the materials for the manufacture of dyes, disinfectants, drugs, high explosives, &c., and of how important it is that the industry should be kept up to high-water mark as a provider of fundamental requisites in the

most economical and business-like way. But "truth will out;" and so perhaps some day the industry will come into its own by proper public recognition. The President thinks the Government should assist and protect the industries of the country as much as possible. He sees no reason why, given equal chances, this country should not build up large chemical and dye industries as Germany has done. But there must be research and business organization. The promised contribution of our home Government of £100,000 over ten years for aniline dye research alone appears to the President to be inadequate. There followed a protest against the use of crude tar on the roads. The War Office has requested that this be discontinued, as the toluol and phenol are useful to this country and its Allies in the international conflict; and Mr. Bond is satisfied that dehydrated and refined tar is far more preferable than crude tar for road work. The refining process is an inexpensive one. To comply with the War Office order, the distillation should be carried to a temperature of not less than 220° C., to ensure the removal of the whole of the toluol with a quantity of the phenols.

Coal Prices and the Search for Economy.

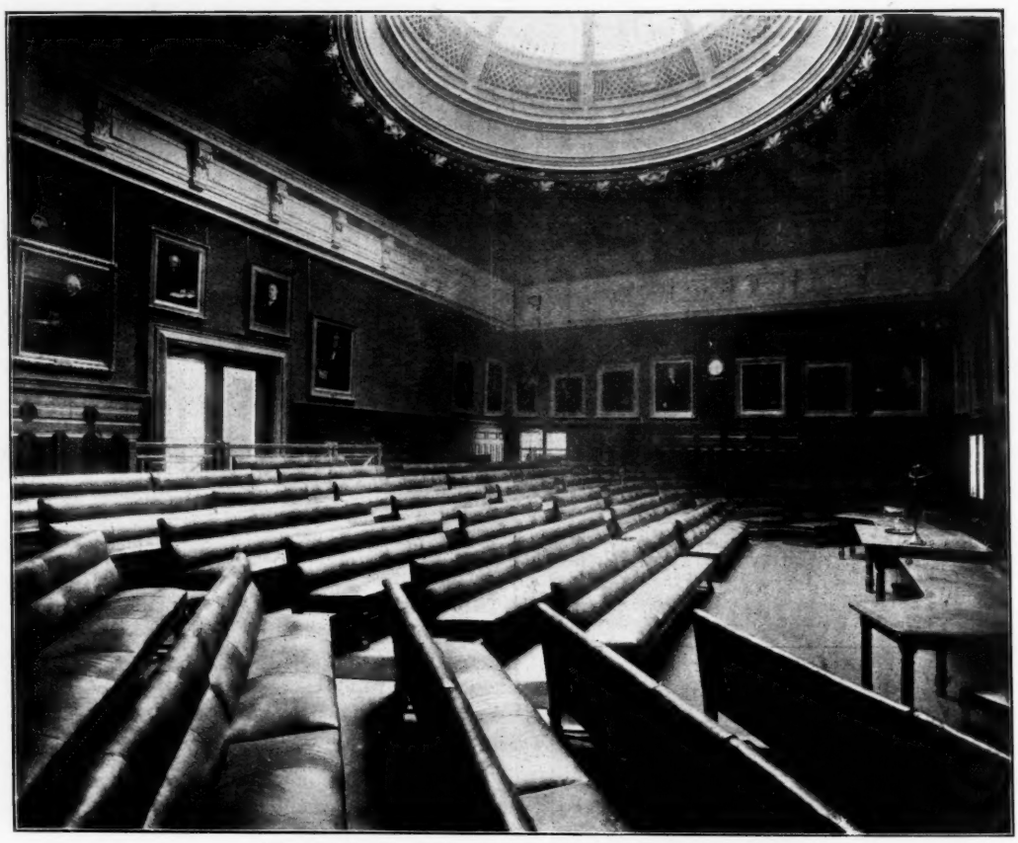
The coal crisis could not fail of prominent place in the address. The causes of reduced output, the depletion of coal stocks, and the rising demands of the country's industries for fuel were referred to. Not far ahead the gas industry has another winter to face. Cause for anxiety, too, is the enormous increase in the price of coal. In the year 1905, Southport bought rough slack and nuts at 8s. 8d. per ton; and just before the war 12s. 1d. was being paid. Now a further advance of 5s. has been made. The President considers the Government should have taken some steps to restrict these excessive advances. The prohibition of exports to neutral countries is also a step that might have been taken earlier than it was. Anyway, raw material is bound to remain at a higher price than ten years ago, and so it is vital to the industry that fresh economies should be sought. The President is persuaded that this can only be done through research laboratories carried on in no half-hearted manner by the industry.

Gas-Fire Testing and Business.

Attention was diverted to a subject in which the President has taken considerable interest, and has prosecuted much investigation at Southport. There is some satisfaction upon his part with the development of gas-fires; and, as to testing their radiant efficiency, he has arrived at the conclusion that the standard test should be a hemispherical one. The horizontal test is of value in conducting experiments on "fuels," and as a guide to the adjustment of flames. Several methods have lately been devised for testing the radiant efficiency of gas-fires; and a Committee, the President mentions, has been formed for considering the question of a standard radiometer. The importance of the proper fixing of gas-fires was dealt with; and an account was given of what the Southport Gas Department does in supplying to plumbers and ironmongers in the town the necessary apparatus for making a good show in their shops. Gas-fires and heating apparatus are fixed free of charge to the consumers. Several details as to the arrangements subsisting between plumbers and ironmongers are given in the address.

Recognition.

Recognition was made of all the work that is being conducted for the gas industry at the Leeds University; and there were cheers when the President referred to the industry being fortunate in having in the Livesey Memorial Chair a man of the ability of Professor Cobb. He thinks the time is now ripe to continue gas-heating research in connection with ventilation and gas-lighting. The work of the British Commercial Gas Association and of the Sulphate of Ammonia Association was commended; and an appeal for the Benevolent Fund of the Institution fittingly closed an address eminently suited to the occasion—an address full of important matter, expressed in concise terms, and permeated with practical philosophy.



THE LECTURE HALL, WHERE THE MEETING WAS HELD.

Compliments fell upon the President from Mr. Alexander Wilson and Mr. D. Irving, the latter of whom claims a close association with Mr. Bond in the earlier part of his career. He made eloquent reference to the ability of the President, and to the services he has rendered not only to the industry, but to the nation through the High Explosives Committee during the last ten months, and without fee. This, said Mr. Irving, is extraordinary, because with many people patriotism nowadays seems closely allied with the making of profit. The encomiums were endorsed by ringing applause, which was continued as the President rose to make

his acknowledgments, which he did with his characteristic modesty.

Recruiting and Workers' Medals.

The annual report was next presented. The main portions of it were published in the "JOURNAL" for May 18 (p. 383). One outstanding feature to which attention was called by the President is the Corbet Woodall Scholarship; and satisfaction was expressed that this has been established at the Leeds University. There was a long discussion on the subject of recruiting and its effect on gas undertakings, owing to the desire on the part of their spirited employees to serve the country in the struggle for the world's liberty from the tyrannical militarism of Germany and its Ally. Discussion was led into this channel by the remarks of Mr. C. E. Jones, who is looking forward to the time when our valiant men will return victorious. He hopes that in some striking way the industry will mark its admiration for the valour of its own soldiers and sailors. As to recruiting, it seems that there is no really definite universal rule in existence about further recruiting from gas undertakings. Every facility has been given by the industry for service by its men in the war. But now a point has been reached when recruiting is pressing very hardly upon many undertakings—especially (as Mr. R. S. Tobey points out) the smaller country ones, which cannot get from their own immediate localities men skilled in various work, while other concerns cannot come to their assistance through not having the men to spare. There is no uniform practice among recruiting officers; and several instances were given where, although in some places there is recognition that skilled men must not now be taken without the consent of the manager of the concern, in view of the jeopardizing of the public gas service, some subordinate recruiting officers advise the men, when they cannot get permission to enlist, to go and give a week's notice. Mr. C. F. Botley desired to know what the Council have done to get proper regulation applied to this question of recruiting; but nothing of a very positive character seems to have been done—at any rate, nothing upon which reliance can be placed as supplying a definite rule in dealing with the question in each locality. Mr. W. W. Townsend desires to see a roll of honour for the men of the gas industry printed in the "Transactions" of the Institution. The members endorsed this, but stuck tenaciously to the more pressing subject of recruiting, and many were the views expressed. Several of the speakers testified to the fact that there are still many men who would like to go to the front, but necessity in their ordinary employment imposes a restraining hand.

It was thought by Mr. W. N. Westlake that such men ought to be given some token to wear, to show that public service keeps them at home; and from this the discussion drifted on to medals. Some public undertakings are adopting medals denoting public service; but the view seemed to be that such badges were of little use unless recognized by the War Office. The War Office, however, will not authorize a specific badge to be generally employed by public service undertakings; but according to Mr. R. W. Edwards the War Office are not averse to giving approval in the case of public undertakings to badges (which the latter chose to submit) for use where necessity compels. Something will have to be done to satisfy the men who want to serve the country, but must needs stay at home. It is likely, however, that something, as Mr. Thomas Glover suggested, could be done for them now, in the way of obtaining recognition, by making representations to the High Explosives Committee, in view of the importance to the Committee of not draining the gas industry of the most skilled men, so as not to risk impairing productive efficiency. Medals or badges, of course, should not be given indiscriminately; and Mr. Henry Woodall would make it a *sine quâ non* that men should only have them who put in full time and work properly, as in ammunition factories. It will be seen from the complete report elsewhere that there were a number of speakers on the subject of recruiting and medals in relation to gas workers, which shows its importance. The President promised to draw the attention of the War Office to the question. Meanwhile, all must recognize, with Mr. Alexander Wilson, that this is a matter which is going to cause gas undertakings a considerable amount of inconvenience; and they will have to make the best of it.

Refractory Materials.

The Refractory Materials Committee have had their work curtailed during the past year through two causes—the military service of some of the members, and the unavoidable delay there has been in securing the apparatus necessary for Dr. Mellor to pursue the pre-arranged investigations as to the behaviour of refractory materials under load, the differences in size of bricks when cold and when subjected to high temperatures, and as to the efficiency of jointing materials. Questions affecting modification of the standard specification have been under consideration. One point is as to the "grog" used being free from dust, and containing nothing to pass through the 16-mesh standard. The Manufacturers' Committee, however, report that the removal of the dust from the "grog" is beneficial; and so no alteration is to be effected in this respect. Questions have also been raised as to whether alterations should be made in the various physical tests prescribed for the different classes of refractory materials; but it is considered inadvisable at present. Mr. S. Glover spoke to the adoption of the report; but there was a little criticism from Mr. H. Kendrick, who does not find that retorts made to the Committee's specification are any better than those that were formerly produced, although a higher price is paid for them. He thinks the question of refractory materials requires consideration *de novo;* and "Hear, hear" came from various parts of the hall. A pertinent question was put to Mr. Kendrick by Mr. J. P. Leather. It was as to whether he had tested the retort material to see that it complied with the standard specification. It seems that Mr. Kendrick's tests were in the nature of observation at the makers' works.

Coal Supplies.

Consideration was next turned to this important matter by Mr. Edward Allen, who moved a resolution expressing the fervent hope that success would attend the action of the Council in arranging for a conference with the Institution of Electrical Engineers, and in prosecuting the objects outlined in the resolutions passed on that occasion. It hardly needed a resolution to put on record a consummation so devoutly desired by all concerned in the two industries. To Mr. Allen's mind, there are two main features in the resolutions—first, that transport should be facilitated; and, secondly, that something should be done to ensure that the price of coal should be kept at a reasonable level. There fell from Mr. Allen a serious allegation, and one not altogether justified. He prefaced it by expressing the opinion that if the question of coal supplies had been taken up by the gas industry (say) last January and the coal owners had been approached, 2s. 6d. per ton increase would likely have been agreed upon as satisfactory. He then proceeded to charge the gas companies in London and the South of England—he acknowledges the difficulty they had in obtaining coal—of having gone to Lancashire, Yorkshire, and the Midlands to buy coals, and of disturbing the whole market, with the result that 5s. and 6s. per ton extra has had to be paid. In Scotland, the coal people are getting, he says, as much as 10s. and 11s. per ton more. In his opinion, gas undertakings ought to associate themselves for the purpose of dealing with this question of price from year to year; and he knows that coalowners in Lancashire have expressed a willingness to sit down annually to a round-table conference, and discuss prices and deliveries. What is now wanted is to get the Government to look into the question of price, and to enable coal to be moved more freely about the country.

This question of coal transit Mr. W. W. Woodward also thinks is very important; and he does not look with equanimity upon what will happen next winter unless the matter is seriously tackled. Many undertakings have already bought coals; but many have not. Those who have not are anxious to get the opinions of others as to what they should do. Mr. Allen thinks, not having bought before, they ought not to buy just yet. Mr. C. F. Botley, from his South-coast location—geographical situation is very important in creating differences of experience with coal supplies, and hardening or lightening difficulties—inclines to the view that persistent and energetic action is desirable. Representations to the Government Departments and then awaiting their pleasure is no good. A remark of his that the results of representation up to now have been almost negligible was met with an emphatic "No, no." Whereupon he observed that, if others have had happier experience than he has had, then he is glad, which is a very benevolent spirit. His later remarks showed that he for one does not deserve the condemnation of Mr. Allen, as to southern works having rushed into the market and spoilt

it; and his final words may appeal to the Government. If the Government, he said, want the help of the gas industry, then the Government in turn must help the gas industry. Mr. George Helps gave a hard nut to crack when he asked if those who had not purchased would be wise to do so, or wait still longer. There was laughter; and there was further laughter when the Presdent, for one, declined to express an opinion. It was pointed out by Mr. Robert Watson that many large undertakings have purchased at high prices; and there is only a certain amount of coal left for disposal. He therefore thinks if the undertakings that have not purchased have long to wait, they will have some difficulty in restoring their stocks. It was urged by Mr. R. G. Shadbolt that every individual should do his utmost to bring pressure to bear upon members of Parliament to attend the conference with the delegates of the gas and electricity industry to-morrow (June 9) at the House of Commons. By this means, a great deal more good may be done than by now speculating as to the result. There was protest from Mr. F. W. Cross against Mr. Allen's imputations as to Southern gas undertakings having rushed in to buy coal, and so raised prices. Whatever the southern men have done has only been due to sheer necessity in the effort to keep their works running and the supply of gas uninterrupted. Then the resolution was carried expressing the hope as to success attending the movement that is being made with a view to easing the situation.

Ventilation Research.

The second report of the Ventilation Research Committee was then submitted by Mr. W. Harrison, M.Sc. This Committee is constituted of members of the Institution and of the Leeds University, with Professor Arthur Smithells, F.R.S., as Chairman. The research is being carried out in the Department of Coal Gas and Fuel Industries by Mr. Harrison, under the supervision of Professor Cobb. The report is of considerable length; but from the abstract given by Mr. Harrison, it appears that it has been considered advisable to investigate a number of points generally assumed to be self-evident in connection with ventilation, since the methods of investigation at Leeds were found to be comparatively free from the disturbing factors usually present in investigations of this type. In carrying them out, it was found that the use of a ring-burner under a flue gave a much more even distribution of temperature in the flue gases than a burner with a central flame, and consequently gave greater ventilating efficiency. For this reason, the ring-burner was chosen as a standard for the comparison of other burners for ventilating power. Experiments made with a burner in different positions relative to a flue show that, in using such a system for ventilating purposes, attention should be paid to the adjustment of the relative positions of burner and flue. The comparison of various types of incandescent burners placed under a flue of a certain shape and dimensions has shown that the differences in efficiency are only of the order of 10 per cent., and are mainly due to deflectors added for the purpose of protecting the fittings from the corrosive action of the hot gases. If the protective action of such deflectors is satisfactory, this reduction in ventilating efficiency may be justifiable. The figures in Table III. of the report [which is reproduced elsewhere] will only become useful when flues are adopted for ventilation in conjunction with burners of the type tested.

By means of the apparatus used for comparing burners, it has been definitely shown that a burner will not turn all its products of combustion up a flue unless sufficient means are provided for the inlet of air into the space from which the ventilating system extracts air. Further that when two ventilating burners are used to ventilate the same space, unless suitable inlets are provided, the stronger ventilating system will overcome the weaker one, and draw some products of combustion into the space. Experiments made with a burner and flue using different consumptions of gas have shown that, with a particular system, there is a consumption of gas which it is disadvantageous to increase.

Summarizing the results obtained in these experiments, it appears that, in order to get a great efficiency of ventilation by means of gas-burners used in conjunction with flues, care should be taken to make a proper proportion between the amount of gas burnt and the size of the flue, and to obtain an even distribution of heat throughout the flue gases. It is advantageous to keep the temperature of the flue gases as low as possible, providing precautions are taken to preserve the small, but necessary, head in the flue.

It is also learned from Mr. Harrison that his experiments have shown that the experimental room described in last year's report is quite satisfactory for the purpose of testing ventilating systems, being practically free from the disturbing influences usually present in investigations of this kind. It has been possible to show the influence of various features of design in a gas-fire on the amount of air moved up a flue of given dimensions; and, what is of importance, it has been demonstrated, the Committee think beyond question, that even modern representative types of gas-fires exhibit wide differences in their ventilating capacity—the amount of air moved per cubic foot of gas burnt varying from 90 to 170. In gas-fires in which the resistances offered by parts other than the flue-vent are of the same order, the volume of air moved up the flue appears to be almost directly proportional to the area of the flue-vent. The figures (cols. 11, 14, 17 in Table VI.) showing the relation between these quantities also indicate the influence of other features of design. In fires Nos. 1, 5, and 7, this relation is greater than with the other fires; and the improvement is attributed to the area of canopy, which is greater with these fires. It has been found possible to increase the ventilating power of a gas-fire, by making auxiliary openings in the flue, up to 10,000 cubic feet per hour by a fire burning 24 cubic feet of gas per hour. The natural result of such a relatively large volume being moved is that the temperature of the flue gases is very low, so that the head acting in the flue is very low. In order to get the best practical advantage, care must be taken to preserve this small but necessary head in the flue.

Acknowledgments and Otherwise.

The adoption of the report was moved by Professor Cobb, who regretted the inability of Professor Smithells to be present for the purpose. He testified to the energy and ability Mr. Harrison has shown in the work. While some of the matters in the report may appear as somewhat abstruse, the Committee have found it advisable to emphasize the fact that some points are self-evident. But it is, as Professor Cobb says, generally the self-evident things upon which people disagree in this matter of ventilation. There is the evidence in the report that there has been an attempt to make it as practical as possible, while bearing in mind the primary necessity of scientific exactness, if the results are going to be of an unquestionable kind. There are, Professor Cobb finds, signs that the intrinsic and growing importance of ventilation is now becoming more adequately recognized. In the opinion of Mr. George Helps, the report was too important for the meeting to deal with in an offhand manner. There had not been time for the members to make proper study of it; so that no criticism could be offered which would enhance its value. The suggestion was advanced by Mr. Alexander Wilson that considered communications on the subject of the report should be sent to Mr. Dunn or to the technical journals. This would be better than an imperfect discussion. Promise was made by Professor Cobb that any criticisms would be carefully considered. The motion for the adoption of the report was thereupon carried.

Elevations.

The Scrutineers next reported. Loud cheers accompanied the announcement that Mr. John Young had been unanimously chosen to fill the presidential chair. There were happy expressions from the President regarding Mr. Young personally and his qualifications for the honorable post. There was a repetition of the emphasis of goodwill and confidence as he rose to express his acknowledgments. The kindly reception gave him courage to ask for the support and co-operation of the members of the Institution. This really needed no asking, for Mr. Young's popularity is so well established in the gas profession. Mr. A. E. Broadberry advanced to the Senior Vice-Presidency; and Mr. Samuel Glover is the new Junior Vice-President.

Next Year's Meeting.

Being quite agreeable to the President-Elect, it was decided that next year's meeting should be held in London

One Honorary Member.

The President of the Société Technique was elected an honorary member of the Institution. It is a long time since the same honour was not conferred on the President of the

German Association. We are sorry that events have necessarily brought about the discontinuance of a happy feature of international courtesy in connection with the gas industry.

Votes of Thanks.

There followed—this finishing the business meeting—the usual group of resolutions thanking the President, the Council, the Council of the Institution of Civil Engineers, the Research Committees, the Hon. Secretary, the Secretary, and, in fact, all contributors to the well-being of the Institution. In again referring to the home for the Institution (to which allusion has been previously made in this "Review" of the proceedings), Mr. Bond said that he should in such a building like to see laboratories for the gas industry properly equipped with appliances and men.

Benevolent Fund.

In the afternoon, there was a meeting of subscribers to the Benevolent Fund. It was a mistaken arrangement. There would have been ample time after the business of the morning sitting to have transacted the work of the fund; and there would then have been a good attendance. As it was, the number of subscribers who were present in the afternoon was absurdly small—in truth, the meeting was no better than an apology for one; and it certainly emphasized an error of judgment or an oversight—one of the two. The mover and seconder of the resolution for the adoption of the Committee's report were the President-Elect and the Senior Vice-President (Mr. John Young and Mr. A. E. Broadberry respectively) and both gentlemen continued the appeal which necessity unfortunately compels should be made from year to year for new subscribers to the fund. Mr. Young also suggested reconsideration of individual subscriptions; but it seems too bad that the "willing horses" should be made to bear more, while so many who could afford at any rate a small subscription do absolutely nothing. An interesting feature of the proceedings was the reference to the generous donation of £25 from the French Society. Mr. Samuel Glover and Mr. Harold E. Bloor were elected to succeed Mr. Edward Allen and Mr. C. Dru Drury, the retiring members of the Committee.

So ended the day's proceedings, and the shortest annual meeting of the Institution on record. We hope that circumstances will cause it to remain in single state.

THE BENEVOLENT FUND.

MEETING OF DONORS AND SUBSCRIBERS.

Last Tuesday afternoon, the Annual Meeting of the Donors and Subscribers to this Fund was held—the PRESIDENT in the chair. There was but a small attendance.

The HON. SECRETARY (Mr. Walter T. Dunn) read the minutes of the last annual general meeting and of a special meeting held on Oct. 26; and they were confirmed. He then read the report, which was given in the "JOURNAL" for May 18, p. 384.

Mr. JOHN YOUNG (Hull): I beg to move that the report and accounts be received and adopted. The only part of the report that I feel called upon to emphasize is that in which the need for further assistance is pointed out. It is hoped that subscribers to the fund will, by their endeavours to obtain new subscribers, and also perhaps by reconsideration of their own subscriptions, provide the funds necessary for the relief of those who so greatly require it.

Mr. A. E. BROADBERRY (Tottenham): I am pleased to second that. The report shows a record of very good work done in the past. Better work might no doubt have been done if greater funds had been available. I believe, unfortunately, years back, a report got about that rather discounted the usefulness of the fund. I think we all begin to appreciate now that this false report did a great deal of harm; and it behoves us to do all we can to counteract the disadvantages the fund has been under in the past by doing our best to get larger funds.

The PRESIDENT: I should like to bring under your notice a subscription made by the Société Technique de l'Industrie du Gaz en France, of £25. The President wrote to us at the time, and said he was sorry they could not give more owing to the war. He would have liked to have contributed double the amount.

Mr. C. F. BOTLEY (Hastings): May I confess to a feeling of disappointment that the special appeal did not receive a more adequate response? I am afraid, too, it is not very encouraging to the Committee to see an attendance like this at the annual meeting. It is showing great apathy. The gas profession are patriotic enough, surely; and they might be generous enough to do something more to help this fund. At the present time how many people are faced, through no fault of their own, with the most awkward circumstances! We never know when it may be our own turn; and it does seem strange that, with all our members, we cannot get a better subscription list. The Committee ask us to mend our ways; and if Mr. Dunn will remember to send me a form next year, I shall have pleasure in increasing my subscription. But we want many promises, to do any good. I do not remember the names of the Committee; but I do suggest that, in a matter of this sort, it should be made as representative as possible. It should go all over the country. I do hope the Committee is representative, so as to get as wide an interest as practicable. Then I think we shall have a chance of calling people to account. Although there has been some response to the special effort at this particular time, I must confess I am disappointed that it has not been more adequate to meet the requirements of the Committee.

Mr. SAMUEL GLOVER (St. Helens): I do hope this meeting will not mourn the absence of friends too much. We have assembled under extraordinary circumstances; and this afternoon's meeting must not be taken as indicating the amount of interest really shown in the fund. What we do not do to-day we shall persevere with, and do to-morrow. If we could all do as our friend Mr. Botley says, it would be a very good thing.

Mr. W. W. WOODWARD (Salford): We have an annual income from subscriptions and donations of £270; and last year we paid out in grants to widows, orphans, and members £364. Now, I suppose we have between 600 and 700 members of the Institution [A VOICE: 800]; and personally I think that is a very poor return for such a number. If these meetings are held after the Institution business meetings, people go away, and do not come back. I think we should secure a great many more subscriptions if we were able to introduce this meeting in the middle of the ordinary meeting of the Institution, when everybody is present.

The PRESIDENT: That is generally done.

Mr. WOODWARD: If it is, I am surprised we do not get a better result. If an appeal were made by the President at the next general meeting of the Institution, in the middle of the proceedings, when we have the largest number of members present, I am sure we ought to get a very much better annual subscription than £270.

The report was then adopted.

The PRESIDENT: As to the election of two members of the Committee to succeed those retiring by rotation, the Scrutineers have reported that Mr. Samuel Glover, of St. Helens, and Mr. H. E. Bloor, of York, have been elected to fill the positions vacated by Mr. Edward Allen and Mr. C. Dru Drury.

Mr. BOTLEY: Of whom will the Committee now consist?

The HON. SECRETARY: Mr. John Young (Chairman), Mr. S. Glover, Mr. H. E. Bloor, Mr. W. Doig Gibb, Mr. F. W. Stevenson, Mr. Daniel Irving, Mr. Alex. Wilson, the Honorary Secretaries of the District Associations affiliated with the Institution, and Mr. Thomas Berridge and Mr. S. Y. Shoubridge (elected by the Council from the Finance Committee of the Institution).

The PRESIDENT: That concludes the business of the meeting.

GENERAL REPORT.

THE Annual General Meeting of the Institution was held last Tuesday, at the Institution of Civil Engineers, Great George Street, Westminster, S.W.—Mr. JOHN BOND, the Engineer and Manager to the Gas Department of the Corporation of Southport, the President, in the chair.

A Word of Welcome.

There were about one hundred and seventy members present at the meeting, which, excepting the business connected with the Benevolent Fund, was concluded by lunch time. At the opening of the proceedings,

The PRESIDENT (who, on rising, met with a cordial reception) said: Gentlemen, before proceeding with the business of the meeting, I wish to extend to you all a very hearty welcome. Although this is the annual general meeting, it is an exceptional one; but we are living now in exceptional and stirring times. I have no doubt that our nation will triumph ultimately ["Hear, hear"], and that our flag will remain unstained. The first item on the *agenda* is the minutes of the last general meeting, which will be submitted to you.

Confirmation of the Minutes.

Mr. JOHN YOUNG (Hull): Mr. President and gentlemen, I beg to propose that the minutes of the last general meeting be taken as read and confirmed.

Mr. H. C. HEAD (Winchester) seconded this; and it was agreed to.

Appointment of Scrutineers.

The PRESIDENT: The next thing is the appointment of scrutineers, to examine the balloting list for the election of President and Vice-President for the ensuing year, and members and associate members.

Mr. ROBERT WATSON (Doncaster): I have great pleasure in proposing that Mr. E. J. Brockway, of Cleethorpes, and Mr. Harold Baker, of High Wycombe, be asked to undertake the duties of scrutineers.

Mr. H. KENDRICK (Stretford) seconded this; and it was agreed to.

The "London" and Institution Medals.

THE "LONDON" GOLD MEDAL.

The PRESIDENT: My next pleasing duty is to present the medals. I have to ask Mr. George T. Purves to accept the "London" gold medal. Mr. Purves, I have very great pleasure indeed in awarding you this medal, on behalf of the Institution of Gas Engineers, for your very valuable paper on the "Application of Coke-Oven Carbonizing and 'Otto' Direct Ammonia Recovery to Gas-Works Requirements." I am sure this will be a very valuable addition to our "Transactions;" and I congratulate you on being the first member of a Junior Gas Managers' Association to receive this award. [Applause.]

Mr. GEORGE T. PURVES (Chryston), after the medal had been handed to him, said: Mr. President, ladies, and gentlemen, I have to thank the Council of the Institution very heartily for the conferring of this award. When I read the paper, I had no idea I would ever reach such a standard. I appreciate it very highly. I thought to read a paper was sufficient honour. That the medal has gone to a member of a Junior Association will, I think, greatly help juniors to rise and do good work. Thank you very much.

THE INSTITUTION GOLD MEDAL.

The PRESIDENT: The next award is to Mr. Jacques Abady. Mr. Abady, I am very pleased to know that your paper has secured the Institution gold medal. I think your contribution on "Calorific Power as a Standard" will be very valuable to the Institution; and I trust that on a near future date the calorific standard will be the universal one. ["Hear, hear."] I have very great pleasure in presenting you with this medal on behalf of the Institution; and I congratulate you.

Mr. JACQUES ABADY (London): Mr. President, ladies, and gentlemen, any attempt to give verbal expression to my feelings of gratitude at the award which you have made me would be inadequate, as falling far short of what I would desire to express. Although this is the second occasion, Sir, on which the Institution has so honoured me, I cannot truthfully say that receiving medals has become a habit. [Laughter.] So I am perhaps unable to throw into my words the graceful fervour which I am sure must characterize the thanks given by the German bomb-thrower for his daily iron cross. I need say nothing more, Sir, except to thank you most sincerely for this more than generous recognition of the short paper I gave to you; and I can assure you that the interests of the Institution of Gas Engineers will always be my interests.

THE SILVER AND BRONZE MEDALS.

The PRESIDENT: The silver medal has been awarded to Mr. John West; but I have heard from him this morning that he is unable to attend the meeting, owing to the fact that he has to be present at a Coroner's inquest. Mr. West gave a very valuable paper on "Lime and Sulphate of Ammonia as Fertilizers;" and I believe that the effect of this paper on the sales of sulphate of ammonia will be material. I shall have pleasure in handing the medal to Mr. West when I return to Southport to-morrow, if that is your wish. ["Hear, hear."] The bronze medal has been awarded to Mr. B. K. Schieldrop, for his paper on "Some Special Features in Gas-Works Practice from Norway." It is always interesting to us to compare the working of gas-works in other countries with our own. We have had a letter from Mr. Schieldrop; and I will ask the Secretary to read it

The SECRETARY (Mr. Walter T. Dunn) then read the letter, which was in the following terms.

Anne Kures Hotel, Voksenkollen,
May 6, 1915.

Walter T. Dunn, F.C.I.S.,
39, Victoria Street, Westminster.

Dear Sir,—I beg to acknowledge with thanks the receipt of your favour of the 28th of last month, by which I am informed that the Council has awarded me the "Institution" bronze medal for the paper read to the meeting at Liverpool last year.

Will you kindly convey to the Council and the President my sincere gratitude for the distinction thus conferred upon me, and the assurance that I most keenly appreciate and value very highly this unexpected honour.

I regret very much that I shall be unable to accept your kind invitation to the meeting in London on June 1. Failing health has necessitated my absence from work and home for the last month; and when I return, as I hope, in a week's time, important work will chain me to my post of duty.

Yours faithfully,
(signed) B. K. SCHIELDROP.

President's Donation to the Building Fund.

The SECRETARY: Before the President delivers his address, I hope he will allow me to inform the members that I have just had the very great pleasure of receiving from him a cheque for one hundred guineas as his donation to the Institution Building Fund. [Applause.]

President's Address.

The PRESIDENT then delivered his Inaugural Address, which was given in the "JOURNAL" last week, p. 499. At its conclusion,

Mr. ALEX. WILSON (Glasgow) said: Mr. President, I am sure that I voice the feelings of the whole of the members present when I say we are surprised, with the important duties you have had throughout the year, that you should have found time to give us such a long and splendid address. Some of us know particularly how much of your time has been taken up in connection with the work of the High Explosives Committee—and that in addition to the ordinary onerous duties which usually fall to the lot of the President of our Institution; and the comprehensive way in which you have dealt with all the various subjects, I am sure,

deserves our highest thanks. The best of it, I suppose, will be in reading the address over again when we come to sit down over a pipe or cigar; and I am certain we shall then derive a great deal of benefit from the ideas you have put forward. I need say nothing more, but will merely ask the members to give you a most cordial vote of thanks for the splendid address you have just delivered.

Mr. D. IRVING (Bristol): It has afforded me peculiar gratification to be asked to second this vote of thanks to the President. I had the pleasure of being associated with him in the earlier part of his career; and therefore I am particularly pleased to be able to congratulate him upon the very high and honourable position to which he has attained. It is a matter of congratulation to the gas profession, too, that in the critical time through which we are now passing we have had a President who is so eminently fitted—especially upon the chemical side—to render, not only great assistance to the gas profession, but great national assistance to the High Explosives Committee. The President has rendered very great services indeed; and I believe I may rightly say that he has rendered much service, and devoted much of his time, during the last ten months, without fee or reward. Now, this is an exceptional thing, because some of us are disappointed a little in finding that the patriotism of the British is often so very closely allied with making a profit. The President is, however, entirely free from that charge. I have very great pleasure indeed in seconding the vote of thanks to him for his services; and, in doing so, I would just like to add that, though I quite understand the reason, it is still a matter of great regret that he is unable to continue in office for a second year.

The motion having been carried by acclamation,

The PRESIDENT, in reply, said: I thank you very sincerely for the kind words which have been spoken, and for the manner in which they have been received. I had hoped to place before you in my Presidential Address some of the scientific work which we have been conducting for quite a number of years in the Southport gas laboratories; but I thought this was not an opportune time for doing so. I hope, however, to give you some particulars in the form of a report or else a paper; or perhaps they can be embodied in some of the Committee work. I sincerely thank you for your kindness to me.

The Annual Report and Accounts.

[See "JOURNAL," May 18, p. 383.]

The PRESIDENT: The next item on the *agenda* is the presentation of the Council's annual report for 1914-15, and the statement of accounts for the year ended Dec. 31, 1914. One of the outstanding points in the report is the reference to the Corbet Woodall Scholarship; and I am pleased to note that this has been established in the University of Leeds. With regard to the question of coal, I have to inform you that Mr. Allan is going to move a special resolution with respect to coal supplies; and it will not be necessary to discuss this matter on the report. I now have pleasure in moving the adoption of the report.

Mr. A. E. BROADBERRY (Tottenham): I have much pleasure in seconding that.

Mr. C. E. JONES (London): Mr. President and gentlemen, on this unique occasion, I am loth to let the report pass into the archives of the Institution without saying one or two words. I think, Sir, that the response which the gas industry has made to the call of the nation in our hour of peril demands something from us rather more emphatic than what is contained in the first few paragraphs of the report. I am convinced, myself, that the Institution, in the first place, and the gas industry all over the world in the next place, view with feelings of admiration the self-sacrifice of engineers and others engaged in the industry in this terrible conflict which is called a war. A war! I call it murder, as it is. I am sure our hearts go out to those who have fallen in the conflict; and our sympathies are very much due to those who have given their best and their dearest on this occasion. I should like, if I am not out of order, to ask those who may come after us, when this terrible, murderous outrage upon humanity shall be at an end, that they will not forget to commemorate, in some way more striking than a vote of thanks, the admiration that we entertain for the valour of the men whom the gas industry has furnished to the nation in this awful hour. [Applause.]

Gas-Works Employees and Recruiting.

Mr. C. F. BOTLEY (Hastings): I understand the question of coal supplies is to come on as a matter of special resolution presently. I will therefore leave now some observations I had intended to offer at this stage. I would, however, like to ask what is the present position in regard to the regulation of recruiting of employees. I believe, if my memory serves me correctly, that something has been done, and something has been publicly stated; but if fellow-members here to-day are in anything like the same position that I am personally, this question of further recruiting is going to be a very serious one. Most of us, I expect, have lost the most energetic of our men, and we are left in a very difficult position indeed to continue to maintain our statutory obligations. Not only this, but we are often in the position of having to refuse permission to those who might wish to go to the front; and these ardent patriots naturally feel that they are placed in a difficult position, and would like to have some document or some badge to show they have volunteered but cannot be spared in the interests of a public service company or undertaking. I would like to know what definite steps the Council have taken in what, to me, is a most important matter. [Applause.]

Mr. E. A. HARMAN (Huddersfield): I have looked in vain for the National Gas Institute Building Fund. I see by the accounts that £500 was voted by the Council last year for this very excellent purpose. What has become of this £500. Is this the building? [Laughter.]

The PRESIDENT: You will find it mentioned in the accounts.

Mr. HARMAN: No; that is the Accumulated Fund. That is a contribution to a different fund altogether. The National Gas Institute Building Fund is not there, so far as I can determine.

The PRESIDENT: It says—"To Building Fund, £500." That is the building fund.

Mr. HARMAN: I would suggest that in succeeding reports a separate fund be headed National Gas Institute Building Fund, in order that it may bring prominently before the members the value and the liveliness of the fund. You, Sir, have added a generous stimulus by your valuable gift this morning to this purpose ["Hear, hear"]; and I am sure if the matter is kept alive, it will not be very many years before the object of the members is achieved in this direction.

Mr. W. W. TOWNSEND (Colchester): I am in agreement with what Mr. Jones has said. The report does not sufficiently recognize the patriotism of those members of the gas industry, both officers and men, who have enlisted. I should like to suggest the preparation of a roll of honour, on which the names of those who are serving the country could be entered, and then printed in our "Transactions" for future reference. We have the matter scattered about in the Technical Press; but it will make a more imposing show if it is all collected together and printed in the "Transactions." ["Hear, hear."]

The PRESIDENT: Does any other member wish to speak on the report? With respect to Mr. Botley's question, the War Office have sent out a letter stating that, in the case of gas undertakings, any employee enlisting in His Majesty's Army shall get permission from his employer.

Mr. BOTLEY: Have the War Office circulated this letter among their recruiting officers?

The PRESIDENT: It has been published in the Press.

Mr. BOTLEY: Has it been circulated in any other way than the Technical Press?

The PRESIDENT: Yes.

Mr. R. S. TOBEY (Horley): My experience is that no general order has been sent round the country on the subject of recruiting among gas-works' employees. Three of my men just now wanted to go; and I told them they were not allowed to enlist without a certificate from their employers. The recruiting officer, however, to whom I showed the

letter sent by Major Gosset to Mr. Dunn last December, said that gas companies were not included in this, and the men were absolutely free to enlist.

Mr. YOUNG: I think myself there must have been some instructions given, because in my own case they will not accept any gas worker without the consent of the engineer.

Mr. BOTLEY: We want to know whether the thing is done in a businesslike manner. It seems that some have got an instruction, and others have not.

Mr. H. C. HEAD (Winchester): The chief recruiting officer of the Southern Command has no general instructions to that effect.

Mr. W. N. WESTLAKE (Exeter): I do know that certain instructions had been issued to a recruiting officer to approach the engineer before accepting recruits, yet I believe that very morning he had another circular from the War Office asking him to approach various large undertakings in his district to see if they could spare more men. I am sure Mr. Botley is as patriotic as any man here. I am on the same plane with him. We are anxious to help all we can; but there is a very serious difficulty. We have somewhat a young staff; and if all this young staff were to go, we should be faced with very serious difficulties. Therefore some have been told they must remain. I have, however, the same difficulty which Mr. Botley has—that the men feel they are being a little bit worried outside, in consequence of them having been forced to remain because their services are required for the public at home. If some recognition could be given, to show the outside public that the men had, so far as they were able, done their duty, and that duty was at home and not abroad, it would be a very great service.

Mr. W. J. SMITH (Bolton): In Bolton, the Electrical Department have been able to get these badges; and we are making efforts to secure them, and expect to have no difficulty.

Mr. R. W. EDWARDS (Aldershot): There appears to be some instruction to the chief office in London; and only the last few days a badge has been approved by the War Office for the use of certain men of military age. I feel sure men in other cases will have the same treatment.

Mr. KENDRICK: One of my Directors made inquiries as to badges, and was told in the Manchester area it was impossible to have them. I have lost about one-third of my men; and do not want to lose any more. If the matter is going to be brought before the War Office officials, there is one point I would mention. When the recruiting officers —not the chief, but the subordinates—think they have a likely man, and find he is engaged on a gas-works, they say: "Go back and give a week's notice; then come back again." This has been done repeatedly in my case.

Mr. ALEX. WILSON (Glasgow): I think that gas undertakings and all other large undertakings will have to put up with a great deal of inconvenience for a long time to come. We wish to send forward all men required for the Army; but at the same time we want to keep our works going. What we have found in the North is if we have special men who are absolutely required for the carrying on of our undertaking, if we approach the recruiting officers, they generally send these men back to their work again. This being so, they should give some sort of medal or badge to those who are really required for the routine work of the gas department—especially in connection with the chemical work, for at the present time so much depends upon it. We must look forward to losing a great many more of our men who are eligible for the Army; and we ought to do everything possible to help the recruiting officers in this way. Try to fill up their places as far as possible by men who are not suitable for the Army. That is what we are doing in the North. It is going to give us a great deal of trouble and inconvenience; but we must all of us try to face the trouble. [Applause.]

Mr. R. H. GINMAN (Leek): After communicating with the chief recruiting officer at Stoke, and showing him the letter which came in reply to Mr. Dunn, as Secretary of the Institution of Gas Engineers, I have not had difficulty in getting any of my men off. That has not been my greatest trouble; for when I have got the men off, they have given me a week's notice and left me.

Mr. W. E. PRICE (Hampton Wick): We all naturally have men who are anxious to remain at their work. They are quite patriotic. They say they are of more value doing the work they are at than in going to the front, because they are experts. But they complain that people stop them in the street, and worry them as to why they are not in uniform. Badges can be obtained. I have seen some of them made suitable for gas undertakings; and I have seen them also for electricity supply undertakings. Such badges are furnished to the men in the district. The badge I have in my mind has the words in the centre, "On Public Service;" and round the outside would be the words, "Gas Light and Power Supply," or "Electric Light and Power Supply." As I have said, such badges can be obtained; and I think they make it more satisfactory for those men of military age who have to work about the district.

Mr. F. W. CROSS (Lea Bridge): Anyone can put a badge on his coat; but I think we ought to have some authority from the Government for giving badges to our men. ["Hear, hear."] Great numbers of young men have called upon me asking for employment. I say, "Why do you not join the army? We cannot give you employment and put you in the places of young men who have joined the army." They say they have tried to enlist, and I ask, "Where is your certificate?" None is forthcoming; and I tell them, "Go back and get a certificate, and I will employ you tomorrow." Several have come to me; but in only one case, last week, a young man brought me his certificate after being sent away a second time to see if he could enlist. He came back with a certificate marked, "Medically unfit." Anyone can make a badge; but we want something authoritative of this kind.

Mr. EDWARDS: The War Office have not authorized any specific badge for public supply undertakings; but you can provide your own badges and submit them to the War Office for approval. Then you can issue them, obtaining an undertaking from the men to return them if they leave your service. That is what we have done, and what is being done by similar undertakings.

Mr. THOMAS GLOVER (Norwich): This matter has assumed a new phase within the last few days. The Government are putting a little gentle pressure on gas undertakings to produce toluol; and this has suggested a reconsideration of the question as to whether those men engaged in the process of gas making and dealing with residuals should not be provided with a badge. I think, Sir, if you bring the feeling of this meeting to the notice of the High Explosives Committee—Lord Moulton and his assistants—you will not find any difficulty in getting an authoritative badge for such men as are essential to carrying on the gas-making process.

Mr. EDWARD ALLEN (Liverpool): May I just tell you what we do in Liverpool. We have not sought the Government badge; but we have, in addition to those men who wear uniform, and have the button showing they are gas workers, given to the men in ordinary clothes the Company's button, which indicates that they are engaged with the Gas Company. The men tell me that now they are not bothered by silly women, who are very patriotic, but rather inclined to be meddlesome. It has been a very practical means of defending our men; and it is a simple way of getting over the trouble. I should explain with regard to men who have been ready to join the army, our Company grant half pay; but to the man who cannot be spared and wants to join, we say: "You will not get half pay." This has a very good effect. Some have even gone then, and they deserve great credit for their patriotism; but in only a few cases have men who have been treated in this way left the Company's service.

Mr. HENRY WOODALL (London): If a badge is provided, I think it is a proper thing that the man should show by a certificate that he has put in full time before it is given to him. This is done in ammunition factories. In one case I know of, a man is told a medal will be given if he does his work properly; and there are places provided on a card to show that he has done his full time during the period he is required.

The PRESIDENT: I may tell the members that I will place

this matter before the War Office at an early date. I now beg to move the adoption of the annual report and accounts.

This was unanimously agreed to.

Refractory Materials Committee's Report.

[See p. 573.]

The PRESIDENT: I now have pleasure in calling upon Dr. Harold G. Colman to submit the report of the Refractory Materials Research Committee.

Dr. HAROLD G. COLMAN (London): Mr. President and gentlemen, in presenting the report of the Refractory Materials Committee for the past year, I regret to say the shadow of the war falls heavily over it. In the first place, the Hon. Secretary, Captain F. J. Bywater, has been absent the whole time on active service. In addition to this, Major Harold Woodall is away; and in the case of the Refractory Materials Committee of the Society of British Gas Industries, in conjunction with whom we work, some of their members have gone. Major Thomas, for example, has also been away in the same service. Not only so, but you will remember that in the last report mention was made of the preliminary experiments of Dr. Mellor, with regard to the important question of the behaviour of refractory material under load. These experiments have given certain interesting, but so far inconclusive, results; and it was promised at the last meeting that they should be continued on a larger scale, dealing with whole bricks. Though, however, the apparatus was ordered, it could not, owing to the war, be delivered until a month or so ago. Under these circumstances, the work has made no progress. Therefore, what I have to report on behalf of the Committee this year is mainly with regard to the work which they hope now to be able to get on with, as far as circumstances permit. The Committee feel that they ought to continue their work as far as possible; but at the same time, in the prevailing abnormal circumstances, they cannot expect to get along as fast as they would otherwise have done. The work that the Committee now propose to do is to continue the researches of Dr. Mellor on the behaviour of whole bricks of refractory material when tested under load. At the same time, in compliance with the wishes of manufacturers, these tests will be combined with the determination of the size of these bricks when cold and when at a high temperature, so as to get some figures with regard to the varying amount of the expansion of the bricks when raised from cold to high temperatures. A further matter to which attention will be given is that of the cementing material employed in the building of retort-settings. This is a matter of fundamental importance to the duration of the setting. One may quite readily understand settings made of good material coming down because of the failure of the cement material which has been used in their construction. It is further proposed, and will shortly be carried out by Dr. Mellor, to investigate definite cement clays used as jointing material, and more especially mixtures of these with fine grog—a determination being made of their refractoriness and of their permanent expansion and contraction. I trust, therefore, when the next meeting comes we may be able to report more fully on these matters. How far we shall be able to carry them must, I am afraid, remain somewhat uncertain. I have now to formally move the adoption of the report of the Refractory Materials Committee.

Mr. SAMUEL GLOVER (St. Helens): I have much pleasure in seconding the proposal, and do so with the assurance that the members realize the great importance and the usefulness of the work the Committee have under their charge. It is carried out most carefully.

Mr. KENDRICK: Will these experiments that have been carried out on bricks and cementing materials have any reference to the standard specification for retorts? I have been using these retorts ever since they came in; and I can say briefly that, so far as our experience goes, there is no improvement at all upon the retorts that we used some eight or nine years ago, except that we have to pay a higher price for them. [Laughter.] I would like to suggest that, in addition to the question of bricks, the whole question of refractory materials, including retorts, requires going into from the beginning.

Mr. J. P. LEATHER (Burnley): Does Mr. Kendrick get his material tested to see that it does conform to the standard specification?

Mr. KENDRICK: I believe that the Chairman of the Manufacturers' Committee was the man who is most responsible for the standard specification; and he happens to be the chief of the firm from whom we obtain our material. I have been to the works several times; and as far as I can judge from seeing the process of retort-making in practice there, it does comply with the standard specification.

Mr. LEATHER: May I be allowed to speak a second time?

The PRESIDENT: I do not think you will be in order. Do the members agree to the adoption of the report?

The resolution was unanimously carried.

The Question of Coal Supplies.

The PRESIDENT: Now I will call upon Mr. Allen for his resolution with respect to coal supplies.

Mr. EDWARD ALLEN (Liverpool): Mr. President, ladies, and gentlemen, I beg to propose the following resolution:

> "That the members of the Institution here present desire to express satisfaction with the action of the Council in arranging for the Committee on 'Coal Supplies' in association with the electrical organizations, and hope that the Committee will succeed in their important operations."

I need not take up much time by going through the history of this movement. You are all aware that the Manchester Commercial Section felt that this matter of coal supplies needed very careful attention; and they and other Commercial Sections appealed to the Council that they would take steps in the matter. The Council proceeded to deal with the question, and associated themselves with the electrical undertakings; and we had a most successful meeting in London on May 6, at the Institution of Electrical Engineers. I will not trouble you with the resolutions. You know them all. Of the two most important points, one was that the transport of coal should be facilitated, and the other was that the price of coal should be reasonable. I am of opinion, Mr. President, that had this question been taken up last January by the gas undertakings, and the coalowners had been approached, there would have been an amount of 2s. 6d. decided upon as being a satisfactory increase in cost. Unfortunately, Sir, the difficulty of getting coal to London and the South of England, in consequence of the interruption of sailings on the East Coast, disturbed everybody, and the London representatives as well as the representatives of the Southern gas undertakings went to Yorkshire, Lancashire, and Staffordshire; and the impression they gave the coalowners was that there was a great need for coal. This disturbed the whole market of Yorkshire, Lancashire, and the Midlands, with the result that 5s., 6s., and, I am given to understand, in Scotland as high as 10s. and 11s. per ton more was paid. I think after this year's trouble we ought to take more pains to associate ourselves together and deal with this question of coal supplies regularly from year to year. I know the coalowners in Yorkshire and Lancashire years ago said they were prepared to attend a round-table conference every spring, and discuss questions of deliveries and price with gas undertakings. I cannot think it reasonable that 5s. or 6s. should be paid because of war conditions. Besides having this bad effect on us directly, it has made the colliers seek for more wages; and obtaining, as some do, £1 a day, they are content to work three days a week, and want the other three days, not to say four, to spend the extra money. These men, who are supposed to be poor, and to need some assistance in extra wages to meet the increased cost of food, have recently got 15½ per cent. advance. For a man earning £1 a day to get this, is absurd. We have very great respect for the coalowners. We know how truthful they are, and how well they have served us on many occasions. We have disturbed them because we have competed against each other. I trust the resolution will be accepted, and that the important work will be successful, that the Government will give their assistance to enable coal to move freely over the railways and down the coasts of this country, and that the price will, if possible, be reduced from the increase of 5s. It is dreadful to know a great number of large undertakings have paid the money; and the smaller undertakings who have not paid can hardly help themselves. Those who

have not bought ought not to buy; and if we had all agreed to stand together, we should have been paying 2s. 6d. increase, instead of 5s.

Mr. W. W. Woodward (Salford): Personally I have had something to do with this question, with Alderman Phillips, as Chairman of the Gas Committee, and Alderman Kay, the Chairman of the Manchester Corporation Gas Committee. It is a matter of great importance in the first place that we should have an adequate supply of coal, and in the second place be able to move it along the railways and coasts. Last winter I found myself in a very considerable difficulty through the coal not coming along as it should. Although I had coal in stock, I had great trouble in finding men to get it out of stock. It is going to be worse next winter; so this Committee should do everything possible to ensure a regular supply—not only stocks, but a fairly regular supply of coal—because I anticipate very great difficulties in getting coal out of stock, even if we have it on the works. I do not know that I need say anything more in seconding the resolution.

Mr. C. F. Botley (Hastings): If I may be so bold as to suggest it, this is a matter in which energetic action is absolutely necessary. It is no good applying to the Government at the present time and wait their leisure. One has to be very persistent, if one is going to do anything to-day; and up to the present the results of the efforts have been almost negligible. ["No."] Well, that is my experience; and if others have a happier experience, I am glad it is so. There is not only continuity of supply to be considered, but also the question of price; and for those of us who are unfortunately placed, geographically, there is the question of freightage. Not only the question of buying coal at an enhanced price, but also the enhanced cost of freightage. I am not sure the representatives of the South Coast undertakings quite deserve the condemnation of the mover of this resolution, who rather suggests that we in the South and others rushed into the market in Yorkshire and Lancashire and spoilt it. I can only say that I bought coal remarkably well in the Midlands, without any enhanced price compared with what I was giving before; so I am not one of those who upset the market. But many of us are waiting to see the result of the efforts of the Council in this matter. If we are not careful, we shall wait so long that we shall find ourselves in a very awkward position. It is all very well to be told to wait; but each one has to look out for himself, and it is no use waiting and being landed. I hope the Council will be very energetic, and that the members will bring pressure to bear upon their Members of Parliament, so as to make the Government alive to the fact that, if they want the gas industry to help them, they must help the gas industry.

Mr. George Helps (Nuneaton): I should like to ask if any member of the Council is in a position to tell us what likelihood there is of a reduction taking place in the price of coal. There is a very strong feeling in this room at the present moment that many associated with this work of tackling the Government on the matter have already purchased their coal. Will the Council give us their opinion as to whether those of us who have not purchased would do well to purchase or to wait? I believe there are several members of the Institution here who are waiting; and they would like this information from the Council, if the Council are in a position to give it. [Applause.]

The President: I do not know whether any member of the Council would like to give an opinion. Certainly, I should not like to myself. [Laughter.]

Mr. Robert Watson (Doncaster): I take it that it is reasonable to suppose that any work done by the deputation after their meeting on the 9th of this month will necessitate some conference with the coalowners; and therefore there will be considerable delay before questions of price are fixed. I very cordially support the resolution; and we are all of us grateful to the Council. But, still, those of us who have not purchased do know that many large undertakings have settled contracts at high prices. There is only a certain amount of gas coal left; and if we wait until the result of these negotiations has been declared, it is quite possible we may have some little difficulty in restoring our stocks when that should be done. This is an important matter, inasmuch as many collieries—I know of several in Yorkshire—have no coal on their banks. One colliery which usually has from 250,000 to 300,000 tons, has not at the present moment a ton on its banks; and it becomes a serious matter as to whether we should be wise in waiting. It would be a good thing for those who have not bought if some indication could be given as to when we shall hear the result of the negotiations so far as price is concerned. Deliveries, of course, constitute a matter which the deputation will deal with to the advantage of us all.

Mr. R. G. Shadbolt (Grantham): May I emphasize the advice given by Mr. Botley? That is, as to the necessity for dealing with this matter by each member using his utmost endeavour to bring pressure to bear on local members of Parliament to bring them "up to the scratch" for the conference which the deputation are seeking on June 9. We may do more good in this direction than by speculating as to the result, which will make itself manifest shortly afterwards.

Mr. F. W. Cross (Lea Bridge): I rise as a London and Southern district member to support Mr. Botley in his protest against the mover of the resolution saying it is the Southern men who rushed in and raised the price of coal. It has been a matter of necessity for the Southern men to get coal where they could, and at what price they could, to keep their works going. Therefore, it can hardly be said, I think, as the mover said—though I quite support the resolution—that it was the action of the Southern men coming in and buying coals at high price that raised the price of coal. The mover possibly is very comfortable. Perhaps he made his contracts some time beforehand, at a reasonable price of 2s. 6d. or so advance. But we in the South have not been able to do that so advantageously. I simply wish to protest against its being said that the Southern men have raised the price. It has been purely a matter of necessity. Any support I can give to the Committee in the matter, I shall give. We are furnishing returns to the Admiralty and to the Board of Trade; but what advantage this is to them or to us, I cannot see.

The President: I will now put the resolution to the meeting.

Carried unanimously.

Ventilation Research Committee.

[The report is given on p. 573.]

The President: I have pleasure in calling upon Mr. W. Harrison to present the report of the Ventilation Research Committee.

Mr. W. Harrison (Leeds), in complying with this request, indicated the main features of the report, after which

The President said: May I call upon Professor Cobb to move the adoption of the report?

Professor J. W. Cobb (Leeds University): Mr. President, at the last meeting that was held of the Ventilation Research Committee, it was decided that Professor Smithells, who has been acting as our Chairman, should introduce the report and move its adoption, and then the report itself, or rather an abstract of the report, should be given by Mr. Harrison, the Research Chemist. Unfortunately, Professor Smithells has found himself unable to be present. He is very sorry, and asked me to say so. I am quite sure that we all share his regret; but that has in itself one advantage, inasmuch as it enables me to testify—and I am certain that the other members of the Committee will join me in testifying—to the continued and unabated interest which Professor Smithells displays in all that relates to this industry. ["Hear, hear."] He has taken the chair at every meeting—often at considerable sacrifice of his own convenience; and, as I said before, he is extremely sorry not to be able to be here to-day. One reason for this regret is that I am quite sure he would like to say, as I can only repeat from last year, that we have watched with great interest the work which Mr. Harrison has done, and wish to place upon record our personal appreciation of the energy and the ability which have been shown in connection with the work. Some of the points necessarily seem to be somewhat abstruse ones; and also we have found it advisable to emphasize the fact that some of the points appear to be self-evident. But, as a rule, in discussions about ventilation, one is apt to find it is just the self-evident things upon which people totally

disagree. So it has been needful to place somewhat simple matters upon a sound scientific basis. As to the report itself, we have attempted to make it as practical as possible, while bearing in mind the primary necessity for scientific exactness, if the results are going to be of an unquestionable kind. We hope we have succeeded; but, so far as that goes, one must leave the report to speak for itself. It must be by the contents of the report that the work of the Committee is to be judged. I think that what must have struck many of us, when looking at recent scientific and technical literature, and even the daily papers, is that the intrinsic and the growing importance of the subject of ventilation is now really being more adequately recognized. You, as an Institution, have recognized it for some time, and have given very practical effect to the recognition; but I saw, for instance, in the columns of "Nature" last week there was an account, which I do not propose to read, but only to refer to. It stated that a New York State Commission on Ventilation has been established by the New York Association for Improving the Condition of the Poor. The Commission consists of the university professors respectively of physiology, chemistry, psychology, and clinical medicine, together with a ventilating engineer and an officer of the New York State Department of Health. This shows that across the water the importance of the subject is regarded as being sufficiently great to justify a State Commission. Then, no doubt, many of you will have seen a lecture of considerable interest upon the subject delivered by Mr. A. H. Barker* before the Society of Engineers, in which some useful and suggestive remarks were made—particularly of interest to us, I think, at the present time, inasmuch as they rather emphasize the preferential quality which attaches to radiant heat, as distinct from any other form of heat, in connection with the hygienic efficiency of heating and ventilation. I have great pleasure in proposing the adoption of the report.

Mr. George Helps: I should like to say——

The President: Do you second the adoption of the report?

Mr. Helps: I thought it had been done; but I will second it. A report such as this, Mr. President, to my mind, is far too important to be passed or adopted by this meeting in five minutes. There are all sorts of principles laid down in the report; and criticism would enhance the value of it in every way. There is no time for criticism now: and it seems to me, Mr. President, if there had been opportunity, that there are very few members who could have criticized a technical report of this character in the time that they have had it in their hands. It is to be placed on the records of the Institution; and to assume any value at all, it wants criticizing very thoroughly indeed. That is my opinion. I cannot very well move any amendment, seeing that I have seconded the adoption of the report [Laughter]; but I would like to hear the views of other members as to whether they are going to accept a thing like this, and have it put on record as if it is all right, when a good deal may be all wrong. I need not remind you that it would not be the first time that the greatest scientists in the land had been on the wrong tack. The question of the displacement of the coal-fire is of huge importance to our industry. We want to go very slowly about it, and not hand out a report like this, unless it has been thoroughly discussed. It affects the construction of gas fires and burners of all sorts and descriptions; and if the members here are inclined to accept it by glancing at it, I shall have a poorer opinion of the members than I have had hitherto.

The President: I am fortunate in being a member of this important Committee; and I am anxious for suggestions, more especially as to the future work of the Committee. I think they will be very valuable. I shall also be pleased to hear criticisms of the report.

Mr. Alex. Wilson: I do not think we are able to criticize the report; but I would suggest that any communications might be sent to Mr. Dunn or to the Technical Press; and then a reply could be given to them after they have had time to look into them carefully. I think this would be better than discussing the points now.

Professor Cobb: I quite intended to mention that any criticism of the report would be carefully considered. I fully agree with Mr. Helps as to the difficulty of criticizing a report of this kind at very short notice. I believe Mr. Helps's criticism was intended to be encouraging; but I am not quite sure. [Laughter.]

Mr. Helps: Most certainly.

Professor Cobb: But, at any rate, I fully agree with what he says as to the difficulty of impromptu criticism on technical subjects of this kind. So I repeat that any written criticism which any member cares to send to us will be most carefully considered; and, so far as we are able to do so, we shall reply to it.

The President: I will put the resolution to the meeting.

This was done; and it was unanimously agreed to.

President and Junior Vice-President.

The President: I am glad to inform you that Mr. John Young, of Hull, has been unanimously elected to the Presidential Chair of this Institution. [Loud applause.] Mr. Young is well qualified to fill this important office. He has given a large amount of time to the work of the Institution. I have very great pleasure indeed, Mr. Young, in asking you to accept the office. I trust that your year will be a happy one, and that during it you will be able to announce to the members that an honourable peace has been declared throughout Europe. ["Hear, hear."]

Mr. Young (who met with a cordial reception) said: Mr. President and gentlemen, I can only thank you for the great honour you have conferred upon me, and for this further sign of your confidence. The kindly reception of my name gives me courage to ask for the support and co-operation of every member of the Institution during my year of office, and it also gives me courage to ask for your sympathy and forbearance towards all my shortcomings. Nobody knows them better than I do. At the same time, I want to assure you that I will endeavour to the utmost of my ability to safeguard the usefulness and prestige of the Institution. If I can continue the good work that has been done by Past-Presidents, I shall be proud. I thank you again.

The President: I am pleased to say that Mr. Samuel Glover, of St. Helens, has been elected the Junior Vice-President. [Applause.] We all know the valuable work that Mr. Glover has done for the gas industry; and I have pleasure in asking him to accept this important office.

Mr. Samuel Glover: Mr. President and gentlemen, to have been able to serve the Institution of Gas Engineers as a member of its Council has been to me an honour. This is my second term of service on your Council; and I had quite thought that I should quietly retire from my position on the Council, and make room for someone else there. Your Committee who had this matter in hand, and you yourselves, have, however, placed on me a further honour, and a further responsibility. Instead of quietly retiring from my position on the Council, I hereby re-dedicate myself, at your request, to service on the Council.

New Members Elected.

The President: Those proposed for election as members and associate members have all been duly elected.

Members.

Blundell, James Edward, Macclesfield.
Dean, William Ernest, Exmouth.
Donaldson, John Harry, Sevenoaks.
Foster, Edgar, North Sydney.
Gorman, Frederic George, South Suburban Gas Company.
Holt, John Exton, Ilkeston.
Nicholls, Robert William, Durham.
Pritchard, William John, Blaenau-Festiniog.
Ruggles, Frederick Marshall, St. John's, Newfoundland.
Sainter, Ernest, Houghton-le-Spring.
White, Albert James Stephen, Chard.

Associate Members.

Channon, Percival Joseph, Haywards Heath.
Tysoe, Harold M., South Metropolitan Gas-Works, Vauxhall.

Place of Next Meeting.

The President: I have pleasure in proposing that the meeting next year be held in London. I have had a few

* See "Journal" for May 18, p. 402.

words with the President; and he is quite agreeable that it should be held here.

Mr. C. E. Jones: I will second that. I believe London is the proper place for us to meet. It is the centre, not only of the Empire, but of the universe. Every accommodation is to be found in London; and when we go into the question of talent and technicality, it is overwhelmingly in favour of London. If you would allow me one moment, I should like to say, as an advocate of a home for the Institution for many years, that I am glad to hear there has been a move in the right direction, and that the time is not far distant when it will be possible for us to meet and be housed in a mansion of our own.

The President: I am looking forward to that day; and I trust that, when we get the Institution something of the character of this building, there will be better lighting than there is here. [Laughter.]

The resolution was agreed to.

An Honorary Member.

Mr. A. E. Broadberry: I beg to propose the election as an honorary member of the Institution of the President of the Société Technique de l'Industrie du Gaz en France. If we had been meeting in happier circumstances, we should have hoped to have had the pleasure of the presence of the President of the French Society here with us to-day; but unfortunately, of course, this happy *réunion* has been prevented. We, however, sincerely hope that this time next year we may have the pleasure of seeing him among us. I am sure we shall give him an additional welcome when he comes here as an honorary member of our Institution.

Mr. Thomas Berridge (Leamington) formally seconded the proposition, which was carried unanimously.

Votes of Thanks.

Mr. W. Hardie (Tynemouth): I have great pleasure in proposing a vote of thanks to the President, Mr. John Bond, and the Council for the services they have rendered to the Institution during the past year. This, gentlemen, is a resolution that requires, I am sure, at this time, no words from me. We know that they have had a very trying year. The President has kept his Council in good form, notwithstanding the very arduous and difficult subjects that have been constantly cropping-up during the past year; and I think they have done remarkably well. It is not necessary, in proposing a vote of this kind, for one to go into the details of the subjects that have been before the Council; but we do know—at least, I know, from my association with councils similar to this in times past, and through my constant intercourse with those on the present Council—the manner in which the work has been conducted. Speaking as a humble member of the Institution, I am most pleased at the way in which the President and Council have carried on the work. I think we are especially happy in having had in the past year a President such as Mr. Bond—a man of energy, a man of talent. In fact, without saying more, the right man in the right place. I ask you all to join very heartily in this vote of thanks.

Mr. J. L. Chapman (Harrow): I have very much pleasure in seconding this vote of thanks. It has always been to me a great pleasure to think of the old days of the Institution, and to reflect on the work that the Councils have done from year to year.

The vote having been carried with applause,

The President said: On behalf of the Council and myself, I sincerely thank you for your kind expressions. I may say my year of office has been a very happy one, except for the war crisis which has had certain responsibilities, and has been a little worrying at times. But I have had such splendid support from my Council that I have felt that the work has been most agreeable to me. Gentlemen, I thank you.

Mr. W. N. Westlake moved a vote of thanks to the Institution of Civil Engineers for lending their hall for the meeting. They were exceedingly grateful to them.

Mr. H. W. Packham (Kingston-on-Thames) seconded the proposition, which was unanimously passed.

Mr. H. C. Head: I beg to propose that the best thanks of the Institution be given to the Honorary Secretary, the members of Research Committees, and the Scrutineers for their services. In regard to the Research Committees, it would be invidious to specialize individually; they have all done such excellent work. But there is one person I will fix upon, and that is our Honorary Secretary. I am sure we all appreciate the services we receive from our tactful and genial Honorary Secretary. When I say "tactful," that really covers everything. Capacity, brain power, and all else, is covered by the word tact. We are exceedingly pleased to have such an excellent Honorary Secretary.

Mr. Andrew Dougall (Tunbridge Wells): I have very great pleasure in seconding this vote. I have some knowledge of what it is to be the Hon. Secretary of an Institution of this kind, having filled the office for some years for the Gas Institute. I have had considerable acquaintance with Mr. Price, and I know how thoroughly he puts his heart and soul into everything he does. He has, I am sure, rendered the Institution noble service during the past year. We in the South looked upon him as a model Secretary of our Southern Association; and I am sure that the Institution will always find him the same.

After the vote had been cordially passed,

Mr. Price: Mr. President, Mr. Head, and Mr. Dougall, it is very good of you to say what you have said, and for you as a meeting to have received it in the way you have. The very fact of hearing once a year—this year, at any rate, and last year—this satisfied expression of opinion, gives me energy to continue my work for the Institution. I am much afraid there is not a great deal to show for what I do; and therefore the probability is that I do not do much. But be that as it may, I must leave it with you, and you must leave it with me. There are wires which do not always show, but require pulling from time to time; and if what I have done has been satisfactory, and if I have furthered the interests of the Institution in any way, I am satisfied.

The President: There is one more proposal. Presidents may come and go; but I am glad to say that Mr. Dunn remains with us. We could not possibly have done without him during last year; and I have great pleasure indeed in proposing a hearty vote of thanks to him for his services to the gas industry and to the Institution.

Mr. H. Kendrick seconded the motion; and it was unanimously passed.

Mr. Dunn: Mr. President and gentlemen, allow me to thank you sincerely for your vote. It is a great pleasure to work for an Institution who are so appreciative of one's services. I am always glad to do anything I can at any time to further the interests of the Institution.

The Building Fund.

Mr. R. G. Shadbolt: Gentlemen, I should like to say quite unofficially that I think it would ill-become us to separate without expressing our gratitude to the President for the handsome donation he has made to the Building Fund. I propose that our heartiest thanks be accorded to him for his donation.

Mr. E. A. Harman: I second that with pleasure. I hope the donation will serve as a stimulus to others to follow in the same direction.

The proposition having been carried with applause,

The President said: The matter of a house for the Institution has been in my mind for a considerable time—in fact, ever since the jubilee year, when I think it was first brought up. Last year we were able to state that £500 had been laid aside as a nest-egg. I have given a little bit of warmth, just to prevent the egg from getting addled. [Laughter.] In other words, I have subscribed towards the foundation-stone; and I hope that the superstructure will be erected in the near future. I trust that a hall will be built to house the Institution of Gas Engineers, the Society of British Gas Industries, the British Commercial Gas Association, and the Gas Companies' Protection Association. These bodies, I believe, could work successfully in such a building; and they could hold their general meetings there. I should also like to see a separate suite of

offices for each Association. The one for the British Commercial Gas Association might be a little more extensive than the others, so that a grand display of scientific apparatus, gas appliances, &c., could be inspected by any consumer at any time. In saying this, I do not believe the best interests of the industry would be served by the amalgamation of these bodies. But I do think they would be better able to efficiently carry on their work in the interests of the industry if housed in the same building. I should further like to see in connection with this building suitable scientific laboratories—central laboratories for the Institution of Gas Engineers [" Hear, hear"] ; and I should like to see established there the very best scientific men, so that they could get into communication with the laboratories belonging to gas undertakings throughout the United Kingdom. Gentlemen, I thank you.

This concluded the proceedings.

The Benevolent Fund.

In the afternoon, the annual general meeting of the contributors to the Benevolent Fund was held. A report of the proceedings will be found on p. 565.

REPORT OF THE REFRACTORY MATERIALS RESEARCH COMMITTEE—Year 1914-15.

The Committee regret to report that their work has been greatly hindered during the past year owing to the war, as has also that of the Joint Sub-Committee of the Institution and of the Society of British Gas Industries. The Hon. Secretary of the Committee (Captain F. J. Bywater), Major Harold Woodall, and Major Thomas are all absent on active service. Owing to the pressure of other work arising out of the abnormal conditions, the time which the other members of the Joint Committee have been able to devote to the work has been considerably restricted.

In the report for 1914 mention was made of the preliminary results of Dr. Mellor's investigation of the behaviour of refractory materials under load, and that it was intended to continue these experiments. Unfortunately the necessary apparatus for the purpose, which had been ordered, was only delivered during April last, thus making it impossible for Dr. Mellor to complete any further experiments in time for this report. These tests will now be proceeded with ; the new apparatus being suitable for carrying out the tests with whole bricks. In addition, in accordance with the request of the Society of British Gas Industries Committee, tests will also be carried out to determine the difference of size in whole bricks when cold and at high temperatures.

During the year the question of making modifications in the standard specification has been under consideration, more especially with regard to the only point in the specification in which matters relating to methods of manufacture are referred to—viz., the stipulation that the " grog " employed in the manufacture of retort material must be free from dust, and contain nothing that passes through the 16-mesh standard sieve prescribed by the Institution of Mining and Metallurgy. The members of the Joint Sub-Committee representing the manufacturers have considered the matter, and reported that the removal of the dust from the grog is beneficial, and in their opinion should be maintained. It has therefore been decided to make no alteration in the specification in this respect. It appears, however, that in some cases there has been a misunderstanding in this matter, owing to it not having been realized that the standard 16-mesh sieve prescribed by the Institute of Mining and Metallurgy is one in which the wires and spaces of the sieve are of equal size, and which therefore only allows pieces of under 1-32nd inch linear dimension to pass through, whereas in some instances the specification had been construed to mean that all pieces of grog with less than 1-16th inch linear dimension were to be removed.

The question has further been considered as to whether any alteration should be made in the various physical tests prescribed for the different classes of refractory material ; and it has been decided that for the present, and until wider experience has been obtained, it is inadvisable to make any alteration.

In view of the great influence of the quality of the cementing material used for jointing on the good working and life of retort-settings, the Committee, in conjunction with the manufacturers, are arranging for the investigation of this material, more especially with regard to its permanent contraction and expansion, and to the effect of the addition of varying proportions of fine grog to the clays used for the cement. The Committee would be very glad to receive from members of the Institution any information obtained from their practical experience which would be of assistance to them in this investigation.

HAROLD G. COLMAN, *Chairman.*

SECOND REPORT OF THE JOINT COMMITTEE ON VENTILATION RESEARCH.

INSTITUTION OF GAS ENGINEERS AND UNIVERSITY OF LEEDS.

[The Committee consists of Messrs. John Bond, J. H. Brearley, E. W. Smith, and Charles Wood, of the Institution of Gas Engineers, in co-operation with Professors Arthur Smithells (Chairman), Julius B. Cohen, John W. Cobb, of the University of Leeds, Mr. G. R. Thompson, and Mr. William Harrison, Research Chemist.]

The present report contains an account of the experimental work carried out at the instance of the Committee during the year. Attention was first given to a study of burners and orifices in the process of ejecting air, and the relations that should subsist between them in order to secure the greatest efficiency. A careful study was made of a number of points generally assumed to be self-evident in connection with ventilation, in order to place them on the more substantial basis of experimental demonstration.

The experimental room, the construction of which was described in last year's report, has proved very satisfactory, and it has been used for a series of experiments with gas-fires. These have been directed to ascertaining :

1.—The volumes of air moved under the most favourable conditions, and under other definite conditions by a gas-fire.
2.—The relative efficiency of a number of gas-fires under these conditions.

The work has been carried out with great care and skill by Mr. William Harrison, M.Sc., under the supervision of Professor Cobb.

EXPERIMENTS WITH THE BURNER-TESTING APPARATUS.

These experiments were undertaken primarily for the investigation of the various influences affecting the flow of gases where the main motive power was the heat of combustion of the gas, and to determine or confirm the laws of flow. It was possible in the apparatus to adjust the conditions and measure some factors much more conveniently and accurately than in any other way which suggested itself to us, and this placed us in a much stronger position for proceeding with work on the larger scale.

The apparatus has already been described in our first

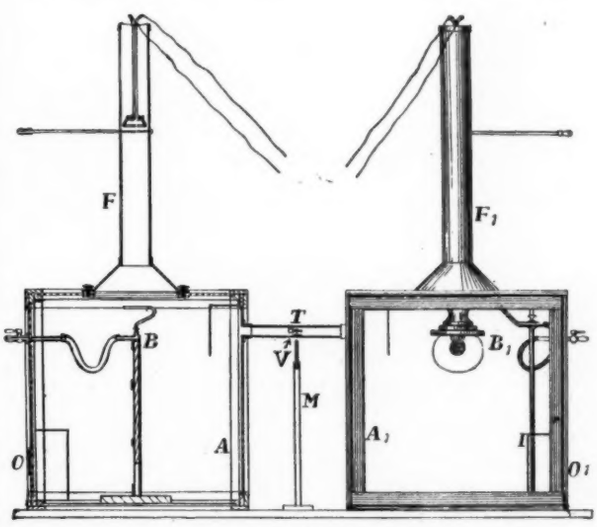


Fig. 1.—One-Eighteenth Full Size.

report [" Transactions of the Institution of Gas Engineers," 1914, pp. 123 to 143*] ; but the diagram fig. 1 is given to facilitate explanation. It will be noticed that baffle-plates have been fixed over the inlet openings and ends of the connecting tube T, to counteract any effect from direct currents of air.

A preliminary test made with a bunsen burner placed under one of the flues showed that the temperature, as determined by an exploring thermo-junction, was greatest near the centre of the flue, as was to be expected.

This effect was minimized by using a ring-burner consisting of a bent copper tube punctured with holes graded in diameter so as to give a large number of flames of the same height. On comparing the ring-burner with the bunsen burner under similar conditions of gas consumption and of position with respect to the flues, it was found that the ring-burner produced the greater pressure-head. The comparatively small quantity of gas which constituted the persisting central hot column from a bunsen burner would emerge from the flue with a high velocity ; whereas when efficient mixing took place, as with the ring-burner, the whole volume of gas would emerge with a lower velocity, representing a better utilization of energy for the movement of gas. If the flue-pipe were longer or narrower, there would be less difference. On account of its greater efficiency, the ring-burner was chosen as the standard for purposes of comparison.

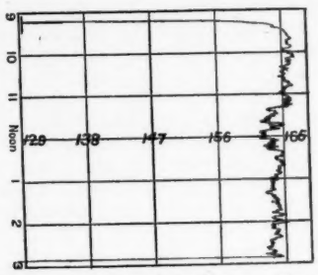


Fig. 2.—Record Taken in One of the Flues. Temperature ° C.

TABLE I.—*Temperature Distribution in Flue.*

—	Temperatures Determined by Thermo-Junction.								
Position	1	2	3	4	5	6	7	8	9
Bunsen burner	149	169	177	173	169	162	153	144	136
Ring-burner	159	164	168	170	170	168	167	165	160

The comparison of burners was carried out in the following manner : The burners were placed under the flues F, F (fig. 1), and when burning drew air through the openings O, O_1 and up the flues. The openings O, O_1 were adjusted until the vane V swung equally about the centre line. The vane never became quite stationary; for the motion of the hot air up the flues was never steady, but oscillated very rapidly. In most cases, the comparison was made with different openings in the two boxes.

Since the temperature of the flue gases was not the same in all parts of the flue, it was necessary to make averaging thermometers. These consisted of very thin platinum wire bent over glass frames [*vide* First Report]. The temperature was determined from the electrical resistance of this platinum wire. When calibrating these thermometers, the resistances were determined by means of the Wheatstone bridge, using the telephone method. It was soon found that the telephone method could not be used when the thermometers were placed in the flues, since the temperature oscillated so rapidly that the adjustment could not be made so quickly as to get the balanced position. The galvanometer method was next used, but, in addition to the very rapid oscillations of temperature, other slower irregular oscillations of about two minutes period were noticed. It was found necessary to take a continuous record of the temperatures in order to get the true average. This was obtained by means of a Callendar recorder, placed at our disposal by the University. Fig. 2 shows a typical record obtained in this manner. All flue-gas temperatures given in the report were taken in this way.

It was observed that the distance between the burner and the base of the flue had an influence on the head produced. For this reason comparisons were made with two standard burners—one being fixed at the base of the flue and the other varied in position.

A similar experiment was made with a bunsen burner in place of the movable ring-burner, in order to make quite clear the difference in effect between a flame with a central hot column and one with a distributed flame.† The results are given in Table II., which shows in column 2 the relative openings in the two boxes required to give a balance ; the opening in box A_1, fig. 1, being kept at 4 square inches throughout the test.

TABLE II.—(A) *Ring-Burner.*

1 Distance in Inches Below Base of Flue.	2 Relative Inlet Opening in Boxes.	3 Opening in Square Inches when Heating Occurred.	4 Opening in Square Inches when Condensation Occurred.
0	1·045	..	..
2	1·105	..	..
4	1·142	1	$\frac{3}{4}$
6	1·185	$1\frac{3}{8}$	1
8	1·208	$2\frac{1}{4}$	$1\frac{5}{8}$
10	1·208	$3\frac{1}{2}$	$1\frac{3}{4}$
12	1·185	4	2
14	1·124	4	2

(B) *Bunsen Burner.*

0	0·967	..	..
2	1·02	..	..
4	1·05	..	..
6	1·08	..	..
8	1·12	$1\frac{3}{4}$	1
10	1·14	$1\frac{5}{8}$	$1\frac{1}{4}$
12	1·10	$3\frac{1}{4}$	$1\frac{1}{2}$

It will be observed that with the ring-burner the maximum head was given when the burner was 8 to 10 inches below the base of the flue, and with the bunsen burner 10 inches below the base of the flue.

When all the hot gases moved directly up the flue, the sides of the box remained cool; but whenever any portion of the hot gases did not escape at once by the flue, but was turned into the box, the sides became heated, and water eventually condensed on the glass. A few observations were made of the conditions under which heating and condensation took place; and these explain the existence of an optimum position.* Heating and condensation occurred the sooner as the distance between the burner and the base of the flue increased, because the column of hot gases spread as it ascended; and when it was wider than the base of the flue, some hot gas was turned into the box (fig. 1).

With the bunsen burner the maximum head was given at a slightly greater distance than in the case of the ring-burner. This was because the flame of the bunsen burner was narrower than that of the ring-burner, so that the column of hot gases was also narrower.

These results show that, whenever a burner is used in conjunction with a flue for ventilating purposes, there is a position at which the burner should be placed relative to the flue; so that, in the first place, the products of combustion can pass directly into the flue and, in the second place, the

* See " JOURNAL " for June 23, 1914, pp. 902-5.

† Both burners consumed 4 cubic feet of gas per hour. The flame with a central hot column was 1 inch in diameter ; that from the ring-burner consisted of fourteen flames, about $\frac{1}{4}$ inch high, arranged in a circle of $2\frac{1}{2}$ inches diameter.

* Columns 3 and 4, Table II., show the inlet-openings in box A_1, at which heating and condensation was observed with the burners in the different positions.

maximum use of the heat in the products of combustion can be made.

Comparison of Various Types of Burner against the Standard.

The next experiments were made to ascertain the influence of the design of the gas-burner on the ventilating effect. The standard burner was placed 6 inches below the base of the flues, since this was the smallest distance at which some of the burners could be placed. In all cases the mouth of the burner, upright or inverted, was placed 6 inches below the base of the flue, and the burners were adjusted to burn 4 cubic feet of gas per hour. The burners used were supplied by the makers as suitable for the consumption of the 4 cubic feet of gas per hour used in the tests.

Observations were made of the temperatures in the flues and the openings in the boxes required to give a balance. When balanced, it is obvious that the same head acts on each end of the connecting tube between the boxes; and since these boxes are relatively large, the same head acts on each inlet opening. Since also these openings are thin plate openings, and air of the same temperature and composition enters each, it may be taken that the volumes passing through are proportional to the areas of the openings. The volumes passing through the standard box for various inlet openings having been determined directly, the volumes passing through the other box could be easily calculated.

In a few cases analyses were taken of the gases in both flues during the burner tests; and the results agreed quite closely with the calculated figures. In Table III. the efficiency of the burner is expressed as the amount of air sent up a flue by the burner divided by the amount sent up by the standard burner burning the same amount of gas and placed at the same distance below a similar flue of the following dimensions: Height, 2 ft. 6 in., width of the top, 3 inches; width of the bottom, 9 inches. The efficiency was greatest with the upright burners. The addition of the mantle reduced the efficiency, since it retarded the upward movement of the hot gases and increased to a slight extent the heat lost by radiation.

Of the inverted burners, outlines of which are given in figs. 3 to 11, those giving a clear passage for the gases into the flue had the greatest efficiency; and thus the addition of deflectors intended for protecting the fittings from the action of the flue gases reduced the efficiency. The greatest efficiency for inverted burners with a mantle was 96 per cent. for a burner having no deflector, and the least (87 per cent.) for a burner with deflector. There was thus a reduction of 9 per cent. by the addition of deflectors. The protective action of the deflectors on the gas-fittings may justify this reduction in ventilating efficiency. It is quite possible, however, that deflectors may be constructed which will effectively protect the gas-fittings yet give a high ventilating efficiency when used in conjunction with a flue, if the necessity for fulfilling both requirements is borne in mind.

Globes with a very open base had no effect on the efficiency, but those with a constricted opening produced a reduction dependent on the area of that opening. A globe with an opening of 2 square inches caused a slight reduction in efficiency [Burner No. 1, fig. 3]. Closed globes are only used in burners of special type where inner globes are fitted [Burners Nos. 4 and 7, figs. 8 and 11].

Table III.—*Comparative Ventilating Efficiencies.*

Burner.	Without Mantle.	With Mantle.	With Mantle and Globe.	Other Tests.
Standard . .	(taken as) 100	—	—	—
Upright A. . .	98	97	—	—
,, B. . .	98	—	—	—
Inverted No. 1 .	97	96	95	—
,, No. 2 .	96	—	—	—
,, No. 3 .	94	93	—	—
,, No. 4 .	93	90	—	—
,, No. 5 .	93	89	—	—
,, No. 6 .	93	88	91	No mantle deflector added 93
,, No. 7 .	93	88	—	—
,, No. 8 .	91	87	—	No mantle deflector added 93
,, No. 9 .	91	87	90	—

In these cases the globes increased the ventilating efficiency of the burners used in conjunction with a flue of dimensions given.

In order to show the importance of allowing sufficient opening for the inlet of air to the ventilating system, a series of experiments was carried out using one of the boxes with a standard burner. In addition to analyses, temperature measurements were taken. The temperature in the flue increased as the opening into the box was decreased down to 1 square inch, after which the temperature decreased and the sides of the box became covered with moisture. Fig. 12 shows the temperature record of this experiment. It was thus shown that when the opening into the system was reduced below a certain amount, the burner failed to turn all

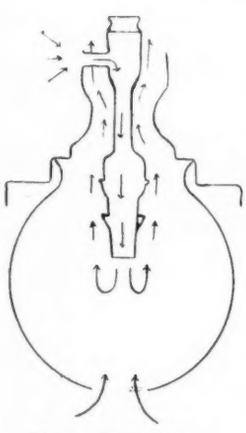


Fig. 3.—Burner No. 1.

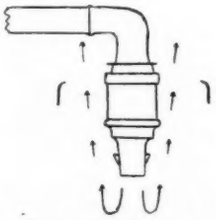


Fig. 4.—Burner No. 2.

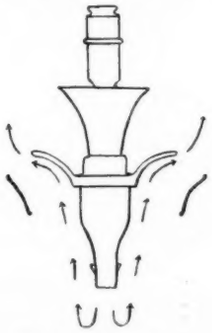


Fig. 5.—Burner No. 3.

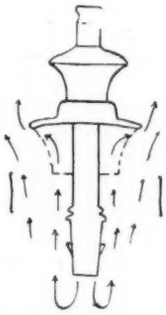


Fig. 6.—Burner No. 4.

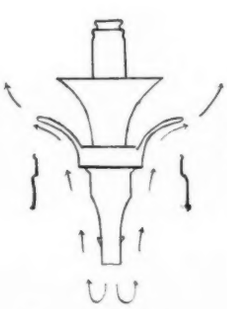


Fig. 7.—Burner No. 5.

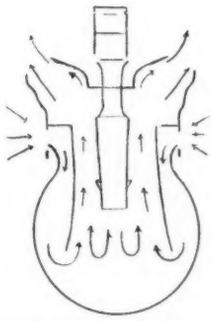


Fig. 8.—Burner No. 6.

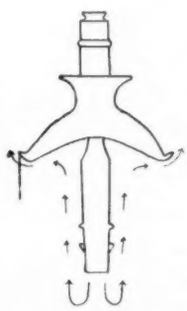


Fig. 9.—Burner No. 7.

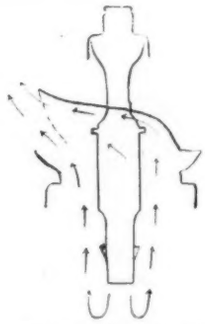


Fig. 10.—Burner No. 8.

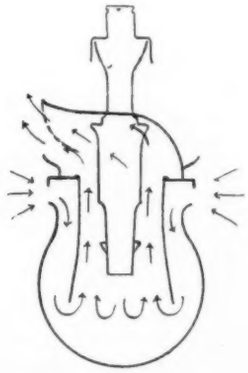


Fig. 11.—Burner No. 9.

[Figs. 3 to 11 are One-Fourth Full Size.]

its products of combustion up the flue. Similar results were obtained with one of the inverted burners.

Another experiment was carried out with the two boxes, using a standard burner in one box and an inverted burner in the other. An opening of $1\frac{1}{2}$ square inches was left into the box containing the standard burner, and the opening in the other was gradually reduced from 2 inches. After $1\frac{1}{8}$ inches, any further reduction in the opening caused the standard burner to draw some of the products of combustion of the inverted burner through the connecting tube T. This experiment showed that in case two ventilating burners are used to ventilate the same space, if the opening for the inlet of air into this space is too constricted, the stronger ventilating burner or system will overcome the weaker one, and draw the products of combustion from the latter burner into the space. If the inlet opening is further constricted, the products of combustion will escape from both burners into the space.

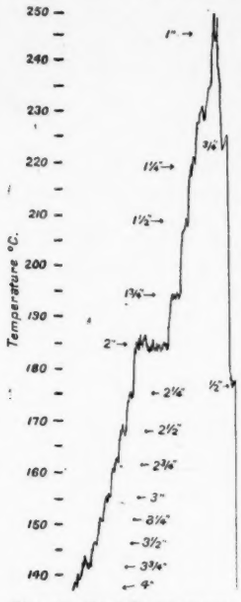


Fig. 12.—Flue Temperature with Different Inlets.

It is not suggested that such effects as those just described would occur in an ordinary room with burners of this type using about 4 cubic feet of gas per hour, but it may occur with larger units if insufficient means are allowed for the entrance of air into the room.

Volumes of Air Moved by Different Consumptions of Gas.

These experiments were undertaken to ascertain the relationship between the volumes of air moved and the volume of gas burnt, in order, if possible, to obtain a means of proportioning these in practice. Experiments were made with a cylindrical flue, 2 ft. 6 in. by 3 inches internal diameter, fixed on one of the boxes A (fig. 1), using an inlet opening of 2 square inches—a standard burner being placed at the base of the flue. A second set of experiments was made with a standard burner fixed at the base of the flue after detaching it from the box. The results of the first set of experiments are given in Table IV. and curve (fig. 13), and of the second set in Table V. and curve (fig. 14).

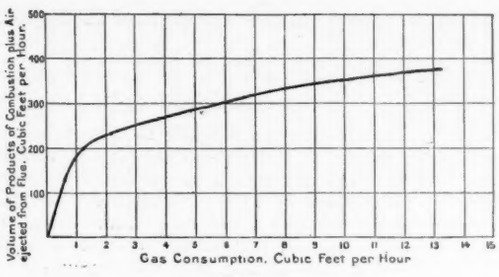

Volume of Products of Combustion plus Air ejected from Flue. Cubic Feet per Hour
500
400
300
200
100
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Gas Consumption. Cubic Feet per Hour

Fig. 13.

TABLE V.—*Volumes moved with Different Gas Consumptions.*

1	2	3	4	5	6	7	8	9
Determined by Analysis.				—		Calculated from Temperature Difference.		
Gas Rate. Cub. Ft. per Hour.	Volume Moved. Cub. Ft. per Hour.	Total Volume Moved by Heat Only. Cub. Ft. per Hour.		Temperature Difference. °C.	Specific Heat KCU per Cub. Ft. at N.T.P.	Total Volume Moved. Cub. Ft. per Hour.	Volume Moved by Heat Only. Cub. Ft. per Hour.	
			Volume / Gas Rate.					Volume / Gas Rate.
0·585	315	305	520	28	0·00863	330	320	550
0·60	300	290	480	28	0·00863	340	330	550
1·28	580	560	390	47	0·00865	430	410	330
1·31	520	500	380	47	0·00865	440	420	320
2·52	640	610	240	65	0·00866	610	580	230
2·525	710	680	270	64	0·00866	620	590	230
3·74	610	570	150	100	0·00870	580	540	145
3·84	640	600	155	100	0·00870	600	560	145
4·96	700	640	140	123	0·00872	630	570	115
4·97	700	640	140	123	0·00872	630	570	115
6·63	700	620	94	158	0·00876	650	570	86
6·65	680	600	91	159	0·00876	650	570	86
8·15	750	660	81	189	0·00879	665	570	71
8·25	740	650	79	189	0·00879	675	580	71
9·60	620	510	53	216	0·00882	690	580	60
9·90	630	520	52	224	0·00883	680	570	58
12·2	740	600	49	268	0·00888	700	560	46
12 5	680	540	43	274	0·00889	700	560	45
15·05	—	—	—	317	0·00893	720	550	37
15·3	640	470	37	323	0·00894	720	550	36
17·05	650	460	27	347	0·00896	750	560	33
17·35	650	460	26	350	0·00896	750	560	32

All volumes are reduced to 760 m.m. pressure and 0° C.

ciency diminishes as the temperature rises. Fig. 15 is a curve obtained by plotting the figures in columns 4 and 9.

On account of the variations in the results obtained by analysis, it was sought to arrive at results from measurements of temperature. Providing no heat is lost from the

TABLE IV.—*Volumes moved with Different Gas Consumptions.*

Gas rate	0·642	0·642	1·18	1·195	2·16	2 19	3·78	3·80	5·15	5·18	7·73	7·80	13·2	13·3
Volume	126	134	192	207	234	229	262	264	272	285	334	325	360	394
Volume / Gas rate	196	209	163	173	118	114	69	69	53	55	43	42	27	30

All volumes given in this report have been reduced to 0° C. and 760 m.m. pressure.

There was considerable variation in the volumes determined by analysis in the latter case (curve B, fig. 14), which was no doubt caused partly by difficulties in sampling and partly by the action of draughts in the room where these tests were made; for the forces acting in the flue were so small that even a slight draught might interfere with the flow of gases.

In order to ascertain the proportion of the volume moved by the injector-action of the gas issuing from the burner, a few experiments were made by simply passing the gas without ignition through the burner placed at the base of the flue, and analyzing the gases in the flue. With a gas rate of 6 cubic feet per hour, the volume of air *plus* gas was 11·8 times the volume of gas used, and with a gas rate of 18 cubic feet per hour, the volume of air *plus* gas was 10·8 times the volume of gas used. The air moved up the flue by the injector-action of the moving gas is thus roughly proportional to the gas consumption.

The volumes moved by injector-action, shown in curve A (fig. 14) were subtracted from the total volume moved when the gas was ignited. The final results are given in Table V. (column 3), and represented by curve C (fig. 14). The figures in columns 4 and 9 of Table V. show how rapidly the effi-

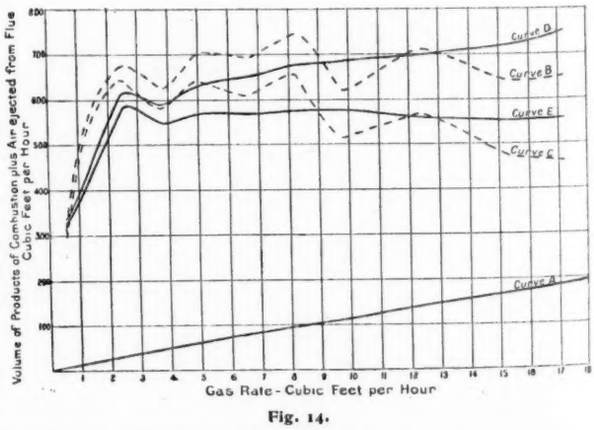

Volume of Products of Combustion plus Air ejected from Flue Cubic Feet per Hour
Curve D
Curve B
Curve E
Curve C
Curve A
Gas Rate - Cubic Feet per Hour

Fig. 14.

Curve A.—Volumes moved by injector action of gas.
" B.—Volumes determined by analysis.
" C.—Volumes determined by analysis, less volumes in Curve A.
" D.—Volumes calculated from temperature.
" E.—Volumes calculated from temperature, less volumes in Curve A.

ventilating system, the volume of gases moving up the flue bears a relation to the temperature represented by the following equation:

V = volume at 0° C. and 760 m.m. pressure. T = temperature °C. K = calorific value of the gas in kilogramme centigrade units per cubic foot at 0° C. and 760 m.m. pressure. s = mean specific heat of products between 0° and T° C. in kilogramme centigrade units per degree per cubic foot at 0° C. and 760 m.m. pressure. v = volume in cubic feet of gas burnt.

$$VTs = vK. \qquad V = \frac{vK}{Ts}$$

All the factors are known except the specific heat s; and this can be calculated from the composition of the products of combustion. This has been done, and the results are represented by the curve (fig. 16), which applies to the products of combustion from a gas of the following composition: 2 per cent. CO_2, 10 per cent. CO, 31 per cent. CH_4, 4 per cent. C_2H_6, 39 per cent. H, 0·5 per cent. O, 13·5 per cent. N,

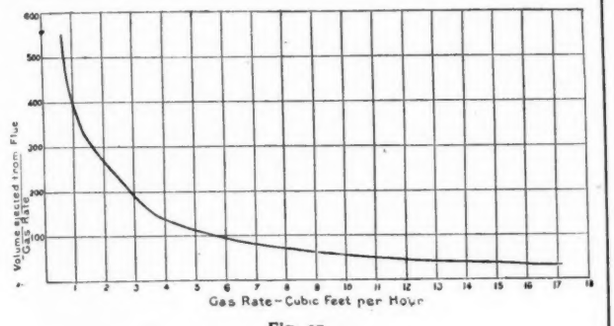


Fig. 15.

and a calorific value of 136 K.C.U. per cubic feet net. The method of calculation for combustion products from gas of other composition is given in the appendix, but the differences are so small that such calculations need not be made. The automatic recording of temperature in the flue renders this method of determining the volume very useful. The results obtained in this manner show much less variation than those obtained from analyses, as will be seen by the curves D and E (fig. 14).

The two curves C and E show clearly that, with the flue in question, the consumption of gas can rise to 2 cubic feet per hour for ventilation, with an accompanying rapid increase in volume of products of combustion, *plus* air, moved up the flue for every unit of gas burned, but that above this amount increase in the volume of gas has only a small influence in increasing the total volume of products and air moved up

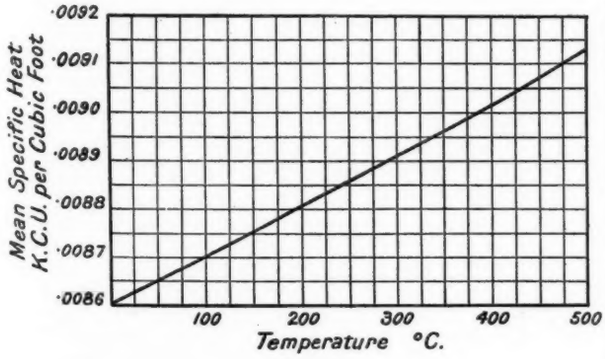


Fig. 16.

the flue. There is apparently a maximum between 5 and 11 cubic feet per hour of gas burned with corresponding temperatures between 120° and 190° C. Peclet's formula indicates the existence of a maximum, but at a temperature of about 280° C. above the room temperature. Whether a maximum exists at the same temperature with flues of other dimensions than the one experimented with, cannot at present be said.

The results obtained are for one arrangement of gas-burner and flue, and indicate clearly the necessity for making tests, and the kind of test which should be made, to obtain information of practical value on ventilating by means of gas-burners.

Tests Made in the Experimental Room.

Since our last report, the special room, of which we gave a diagram [reproduced in fig. 17], has been completed, and numerous experiments made therein. Special precautions were taken in this room to render it as nearly air-tight as possible. The floor was all underlaid with asbestos sheets cemented at the joints before laying on the tongued and grooved floor boards. All joints in the asbestos walls and ceiling were overlaid with asbestos cemented on before nailing, and all other possible sources of leak cemented-up. In order to make the door air-tight, the grooves were coated with a putty made from vaseline and china-clay. These precautions were taken in order to make sure that a minimum amount of air entered through other than known openings. Experiments have shown that this condition was attained.

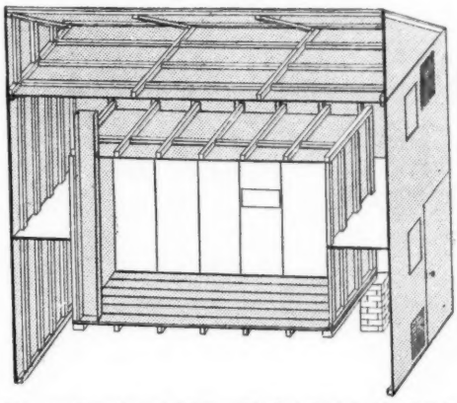


Fig. 17.—Experimental Room [Scale $\frac{1}{8}$-Inch to the Foot].

For inlet, an opening 12 in. by 12 in. was cut in the centre of the wall at the bottom opposite the flue, and framed round with wood in order to fix plates of asbestos cut with holes of different dimensions [A, fig. 18]. For sampling the flue gases, a bent perforated tube T was fitted 7 feet above the base of the flue, and connected through the wall by glass tubes to a sampling apparatus. For measuring the temperature difference between the flue gases and the outer air, two platinum resistance thermometers were made, as shown

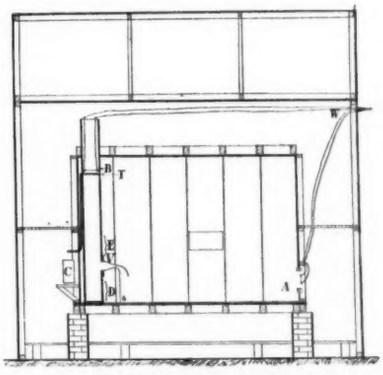
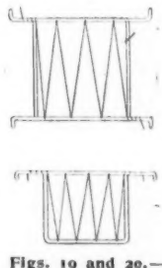


Fig. 18.—Sectional Elevation of Experimental Room [Scale $\frac{1}{16}$-Inch to the Foot].



Figs. 19 and 20.—Averaging Resistance Thermometers.

in figs. 19 and 20. One of these (fig. 19) was suspended at B, about 2 inches above the sampling tube in the flue; the other (fig. 20) was fixed on a swivel-joint, in order to be readily fixed over the inlet A, after changing the plate openings. These thermometers were connected by wires W to opposite arms of the bridge of a Callendar recorder fixed in an outside building. A gas-meter was placed outside the room, at C, in a place convenient for taking readings.

Tests made in the experimental room with the same gas-fire on calm and windy days showed only slight variations. Oscillations of temperature were noticeable particularly on windy days; but they were very rapid oscillations round a steady average temperature, and had little or no influence on the results.

Fig. 21 shows one of the records taken during a gas-fire test; while fig. 22 is a record on another scale taken during an experiment made on a windy and wet day, and shows the greatest variation yet noticed. Thus the influence of

winds appears to have been counteracted by the special construction of the experimental room.

Observations of the temperature in the flue have been made with a gas-fire using various sizes of openings for the inlet of air into the room. As the opening was reduced, the temperature increased until an opening of 4 square inches was used, after which further reduction in the opening produced a decrease in the temperature within the flue. With openings of less than 4 square inches, the gas-fire fails to turn all its products of combustion up the chimney, and an accumulation of products in the room occurs. This observation is similar to one made with a gas-burner in the burner-testing apparatus already mentioned.

It is quite possible that in ordinary living rooms, where from fear of draughts many useful air entries have been

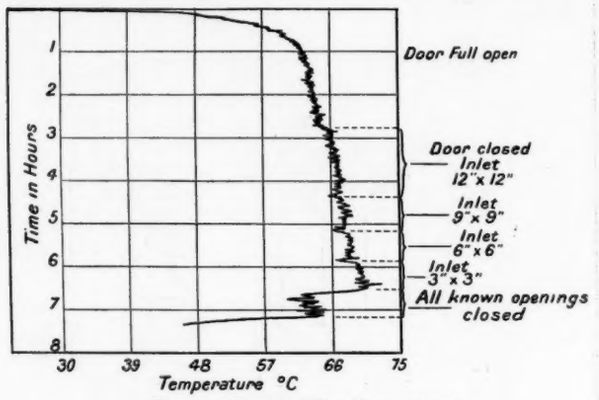


Fig. 21.—Record of Flue Temperature.

closed, the available openings for the inlet of air approach, or even become less than, 4 square inches. Consequently, we cannot over-emphasize the importance of providing adequate openings for the inlet of air into a room.

Numerous tests have been made in the experimental room with various types of gas-fire. The fires were joined to the flue by an adaptor such as is shown in fig. 23, and all joints cemented-up tight. Outlines of the canopies and flue-vents of the gas-fires tested are given in figs. 24 to 30. The fires were adjusted to burn about 25 cubic feet of gas per hour; the makers having in each case been requested to supply gas-fires burning this amount.

Determinations were made of the volume of gases passing through the flue for several areas of inlet. As a rule no tests were made until two hours after lighting the fire;

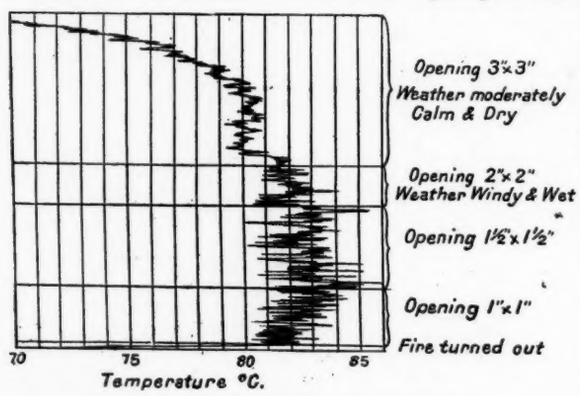


Fig. 22.—Flue Temperature. Weather Effect.

this being the time required for the temperature conditions to become steady [see fig. 21].

Tests made with the door closed and the area of inlet increased, showed that up to 12 in. by 12 in. increased ventilation was produced. Greater inlets, such as obtained by opening the door, did not produce any increase in ventilation through the flue—in fact, in most cases the figure was less when the door was opened. This is due to the fact that some of the radiant heat becomes effective in heating the air within the room, and some of this heated air escapes when the door is opened.

The first conclusion which can be drawn from the results in Table VI. relates to the area of the flue vent. This, although not the only factor in determining the ventilating effect, is of primary importance, as will be seen by a comparison of fires Nos. 2, 3, 4, and 6.

The amount of air moved is about 1½ times as great with fire No. 6 as with No. 2, and the main difference between them is seen to lie in their relative flue-vent area, which is about 1½ times as great with No. 6 as with No. 2. The comparison of fires Nos. 4 and 5 will show, however, that the area of the flue-vent is not the only factor in determining the ventilating effect. The constructional difference between these fires lies in the area just under the canopy. The influence of this area is also shown on comparing Nos. 6 and 7. The influence of factors other than the area of flue is shown in the eleventh column of Table VI., which gives the volumes moved divided by the area of flue.

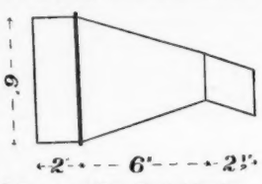


Fig. 23.—Flue Vent Adaptor.

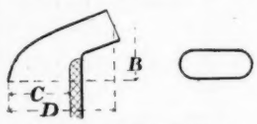


Fig. 24.—Gas-Fire No. 1.

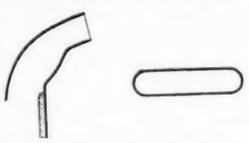


Fig. 25.—Gas-Fire No. 2.

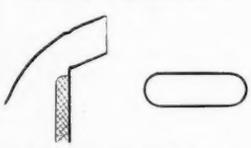


Fig. 26.—Gas-Fire No. 3.

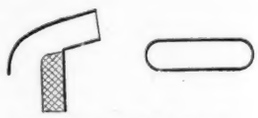


Fig. 27.—Gas-Fire No. 4.

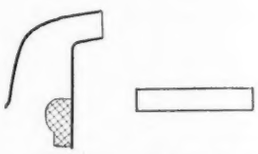


Fig. 28.—Gas-Fire No. 5.

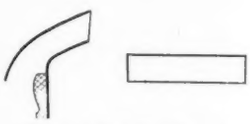


Fig. 29.—Gas-Fire No. 6.

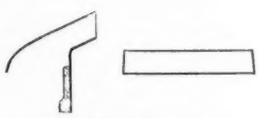


Fig. 30.—Gas-Fire No. 7.

With the exception of Nos. 1, 5, and 7, the figures in the eleventh column are nearly constant, and all the fires to which they refer have somewhat similar narrow canopies. The figures for fires Nos. 1, 5, and 7, which all have wide canopies, are greater than those for the other fires.

In order to get the best ventilating power from a gas-fire, one necessary condition appears to be that the canopy and flue-vent should offer as little resistance as possible to the flow of the flue gases. This may be obtained by having a wide canopy and a wide flue vent. It is likely that general smoothness and simplicity of line in the canopy would also be an advantage.

Experiments have been made to increase the ventilating power of a gas-fire by making openings into the flue. In the case of No. 7 fire, a hole was cut at D under the flue-vent V, near the base of the flue.

With a hole	11¾	in. by	9	in. the quantity of air moved was		10,000	c. ft. per hr.
,,	3	in. by	3	in.	,,	,,	,, ,, 5,400 ,, ,,
With the fire without auxiliary opening						,,	,, 4,100 ,, ,,
				Gas rate			24

In another case a hole was cut at E, from 6 to 18 inches above the centre of the entrance tube from the fire into the flue; the hole at D being closed up. The same fire was used as before, and other conditions were made as nearly as possible the same.

With a hole	11¾	in. by	9	in. the quantity of air moved was		8,300	c. ft. per hr.
,,	6	in. by	6	in.	,,	,,	,, ,, 6,600 ,, ,,
,,	3	in. by	3	in.	,,	,,	,, ,, 4,700 ,, ,,
				Gas rate			24

A similar experiment was made with fire No. 1, which had the least flue-vent area, and under ordinary conditions gave the least ventilating power. With hole 11¾ in. by 9 in. above the flue-vent—*i.e.*, at E—the quantity moved was 8100 cubic feet per hour, for a gas-rate of 25 cubic feet per hour—nearly the same as moved by fire No. 7. It must, however, be noted that the temperature in the flue (27·5° C.

TABLE VI.—*Ventilation by Gas-Fires.*

1. Gas-Fire.	2. Flue. Dimensions. Inches.	3. Flue. Area. Sq. In.	4. Canopy-Base. Dimensions. Inches.	5. Canopy-Base. Area. Sq. In.	6. Distance. B. Ins.	7. Distance. D. Ins.	8. Gas Rate. Cubic Feet per Hour.	9. For Inlet 12 In. by 12 In. Vol. Cb. Ft. per Hr.	10. For Inlet 12 In. by 12 In. Vol. / Gas Rate.	11. For Inlet 12 In. by 12 In. Vol. / Flue Area.	12. For Inlet 6 In. by 6 In. Vol.	13. For Inlet 6 In. by 6 In. Vol. / Gas Rate.	14. For Inlet 6 In. by 6 In. Vol. / Flue Area.	15. For Inlet 3 In. by 3 In. Vol.	16. For Inlet 3 In. by 3 In. Vol. / Gas Rate.	17. For Inlet 3 In. by 3 In. Vol. / Flue Area.
No. 1.	4·9 by 1·9	8·5	10·0 by 4·0	30	3·6½	7·0	24·3	2230	92	263	2040	84	240	1620	67	191
							25·2	2250	88	265	2070	81	244	1620	63	191
No. 2.	7·4 by 1·7	12·0	9·5 by 2·1	20	4·6	5·5	23·1	2290	99	191	2190	95	183	1720	74	143
			9·5 by 2·5	24*			24·1	2450	102	204	2180	91	182	1710	71	142
No. 3.	6·4 by 2·0	12·5	8·5 by 2·9	18	4·4	6·3	23·6	2520	107	202	2280	96	182	1690	71	135
							23·0	2480	108	198	2210	96	177	1680	73	134
No. 4.	7·5 by 2·0	14·1	10·0 by 2·2	22	3·2	6·2	26·1	2960	114	210	2560	98	181	1800	69	128
							25·4	2810	111	199	2560	97	181	1760	69	125
No. 5.	7·7 by 1·5	11·5	11·5 by 2·4	28	5·7	6·4	24·8	2950	119	257	2630	101	229	1860	75	162
			12·0 by 4·0	48*			24·4	2930	120	255	..	..	..	..	..	..
No. 6.	8·7 by 2·0	17·4	9·0 by 2·1	15	4·0	6·2	24·1	3730	155	214	..	..	..	2020	84	116
			9·5 by 3·0	20			24·0	3690	154	212	3240	135	186	1980	83	114
No. 7.	9·5 by 1·75	16·8	11·5 by 4·1	47	3·6	6·6	24·0	4090	170	244	3430	143	204	2070	86	123
							25·1	4280	171	255	3650	146	217	2180	87	130

* Measurement just above fire-brick.

above that of the outer air) was greater than when fire No. 7 was used (21·5° C.); so that the head acting was larger. With a large opening into the flue, it may be taken that there will be but little difference in the ventilating power of gas-fires turning the same amount of heat up the flue. In other words, when the resistance of the auxiliary opening into the flue is small compared with that of the flue-vent, the influence of the latter in limiting the flow is negligible; but when the resistance of the auxiliary opening becomes comparable with, or larger than, that of the flue-vent, and particularly when no auxiliary opening is used, the influence of the flue-vent will be very important.

It must, however, be noted that while the auxiliary opening allows comparatively fresh air to flow through it, the vent conveys products of combustion; and since it is desirable to eject these first, the aim in modern gas-fires should be to reduce the resistance to the flow of these products. Thus a fire with a small flue vent and large auxiliary opening might discharge a large volume of air and products of combustion up the flue but at the same time allow the escape of some products from under the canopy or else through the auxiliary opening, and this would be a very unsatisfactory arrangement. This undesirable condition was noticed when testing fire No. 1 with an auxiliary opening of $11\frac{3}{4}$ in. by 9 in. placed above the flue-vent, using an inlet into the room of 3 in. by 3 in. After two hours, the room air contained 25 parts of CO_2 per 10,000.

The gas fire with auxiliary opening is shown, then, to be capable of inducing ventilation to the extent of 10,000 cubic feet per 24 cubic feet of gas burned, or 410 cubic feet per cubic foot of gas burned, with a comparatively short flue of 10 feet length. In these circumstances, however, it is to be noted that the flue temperature is only about 20° C. above that of the outer air, and the corresponding head in water gauge is only about $\frac{7}{1000}$ of an inch. This is ample for the purpose, but it is necessary that this head should be maintained, and the significance in practice of the observation is that the flue into which a gas-fire works need not give any considerable draught, but it should be shielded with extreme care from outside disturbing influences which would tend to destroy the small, but necessary, draught. The influence of the longer flues in common use has not yet been investigated.

APPENDIX.

METHOD OF CALCULATION OF THE MEAN SPECIFIC HEATS.

The products of combustion consist of CO_2, H_2O, N, and excess air.

Let K = calorific value of gas in small calories per 100 litres of gas.

A = gramme molecules of CO_2 formed by burning 100 litres of gas.

B = gramme molecules of H_2O formed by burning 100 litres of gas.

C = gramme molecules of N left after burning 100 litres of gas.

D = gramme molecules of excess air per 100 litres of gas burned.

T = temperature of products of combustion above that of outer air, ° C.

The mean specific heats at constant pressure of the various constituents of the products of combustion between 0° C. and T° C. are given by the following formulæ (Langens):

CO_2 mean specific heat,	$8·7 + 0·0026\ T$	In small calories per gramme molecule
H_2O " "	$7·9 + 0·00215\ T$	
N " "	$6·8 + 0·0006\ T$	
and air.		

The relation between these quantities is given by the equation:

$$K = AT\,(8·7 + ·0026\ T) + BT\,(7·9 + ·00215\ T) + CT\,(6·8 + ·0006\ T) + DT\,(6·8 + ·0006\ T).$$

A, B, and C are easily calculated from the composition of the gas.

In order to calculate the mean specific heat of the whole products of combustion, it is first necessary to find the quantity D; and this may be found by solving the equation:

$$K = 8·7\ AT + ·0026\ AT^2 + 7·9\ BT + ·00215\ BT^2 + 6·8\ CT + ·0006\ CT^2 + 6·8\ DT + ·0006\ DT^2$$
$$= T\,(8·7\ A + 7·9\ B + 6·8\ C) + 6·8\ DT + T^2\,(·0026\ A + ·00215\ B + ·0006\ C) + ·0006\ DT^2.$$

Since A, B, C, and T are known, we may put

$$T\,(8·7\ A + 7·9\ B + 6·8\ C) = x \text{ and}$$
$$T^2\,(·0026\ A + ·00215\ B + ·0006\ C) = y.$$

The equation then becomes

$K = x + y + 6·8\ DT + ·0006\ DT^2$, in which K, x, y, and T are known. D can then easily be calculated for any value of T.

The mean specific heat is $\frac{K}{T\,(A + B + C + D)}$ small calories per gramme molecule.

This may be converted into K.C.U. per cubic foot by multiplying by the factor 0·001265.

GAS-FURNACES IN INDUSTRY.

Exhibition at Newcastle-upon-Tyne.

AN exhibition of gas-furnaces on a very comprehensive scale was opened on the 31st ult. by the Lord Mayor of Newcastle, Alderman John Fitzgerald, with every promise of success. The exhibition, which will remain open until June 26, is being held by Messrs. John Wright and Co. in conjunction with the Brayshaw Furnaces and Tools, Limited, with whom they are associated, and is under the auspices of the North-East Coast Gas Undertakings. The chair was taken by Sir WALTER PLUMMER, the Deputy-Chairman of the Newcastle and Gateshead Gas Company, and there were present many influential men in the gas and engineering undertakings of the district, together with representatives from both the Armstrong College of Science and the Rutherford Technical College.

The CHAIRMAN, in his opening remarks, stated that this was not an ordinary exhibition in which various popular features were customary, but was of quite a special nature, as it was felt that it would be of great practical utility at the present time when the question of how to turn out sufficient quantities of the various munitions of war was all-important. They believed that by means of gas-furnaces the output of munitions of war would be immensely increased. It was claimed that the work done by these furnaces could be better performed than by those of an older type—there being better control of temperatures; and those who had given the furnaces a practical trial had found them eminently satisfactory. The use of gas for industrial purposes had become very important to all gas undertakings; and they could imagine how important it was to the Newcastle-upon-Tyne and Gateshead Gas Company when quite a conservative estimate placed the gas consumption in its district for industrial purposes at 750 million cubic feet per annum, or nearly a quarter of the total consumption.

The LORD MAYOR, in declaring the exhibition open, said that no more appropriate place than Newcastle could be found for such a display, and no more suitable time could have been chosen. He had it from the highest authority that if the country is to emerge successfully from the titanic struggle in which it is engaged, our entire resources, both in men and material, must be mobilized. Anything therefore which tended to help to increase the output

of these vital necessities would be an important factor. Newcastle was the first city which, at the request of the Government, formed an Armaments Committee, consisting of some of the foremost representatives of employers and workmen. It was doing much useful work and would accomplish still more. The Committee had given a pledge to the King to "deliver the goods," and the pledge would be kept. The exhibition was a timely display of additional means whereby the delivery of the goods might be expedited. With gas-furnaces, less labour was required; and this was the most important factor at the present time. His Lordship added a word of appreciation of the enterprise to the Newcastle and Gateshead Gas Company. He wished the exhibition every success and had pleasure in declaring it open.

Suitable votes of thanks were proposed to the Lord Mayor and to the Chairman, and were carried heartily.

The exhibition includes something like forty exhibits, and is probably the most comprehensive collection that has hitherto been got together in one exhibition. An examination of the various types of furnaces shows that they have been specially chosen with a view of fulfilling the requirements of the districts for the heat treatment of metals of various kinds—from high-speed steel to low carbon steel forgings. Dealing with the former, it was specially to be noticed that these were of the twin-chambered variety, or, in other words, so constructed that the products of combustion from the lower chamber pass through and heat a chamber placed above it. This system tends not only to economy, but is of great practical utility in the treatment of high-speed steel, since it is found necessary to pre-heat it at comparatively low temperatures before subjecting it to the final high temperature which is so necessary for completing the process of hardening. With these furnaces it is possible to attain, with moderate gas consumptions, an exact temperature to deal with any form of high-speed steel cutting tools; and users express their keen appreciation of them. The certainty of result, which is so necessary in producing such tools as will stand up to heavy and high-speed cutting, can be obtained with scientific accuracy—tending, of course, to increased rate of production with less labour costs.

Among the apparatus on view is an automatic rotary shell-heating furnace. This type of furnace is for the purpose of heating and annealing the ends of shell forgings prior to closing the nose under hydraulic pressure. The tray holding the shell bodies revolves, being driven by worm-gear and supported by a vertical shaft running on ball thrust bearings.

Another furnace which is particularly noticeable is a high temperature forging furnace for bar work of all descriptions. On a test made, it was found that ¾-inch square bars could be raised to welding temperature in 1¾ minutes. There was also exhibited for the first time an entirely new design of crucible furnace for the melting of brass, copper, Admiralty mixtures, and similar alloys. This furnace is extremely economical in gas consumption; much economy being obtained by the use of the Brayshaw patent burner, which gives a perfect combustible mixture, together with a regenerative arrangement by means of which the exhausted gases impart most of their heat to the incoming air supply. It is stated that with this furnace it is possible to melt ordinary yellow brass for the consumption of 2 cubic feet of gas per pound of metal melted; and it is so rapid in action that it is possible to get sixteen melts per ordinary working day from one crucible.

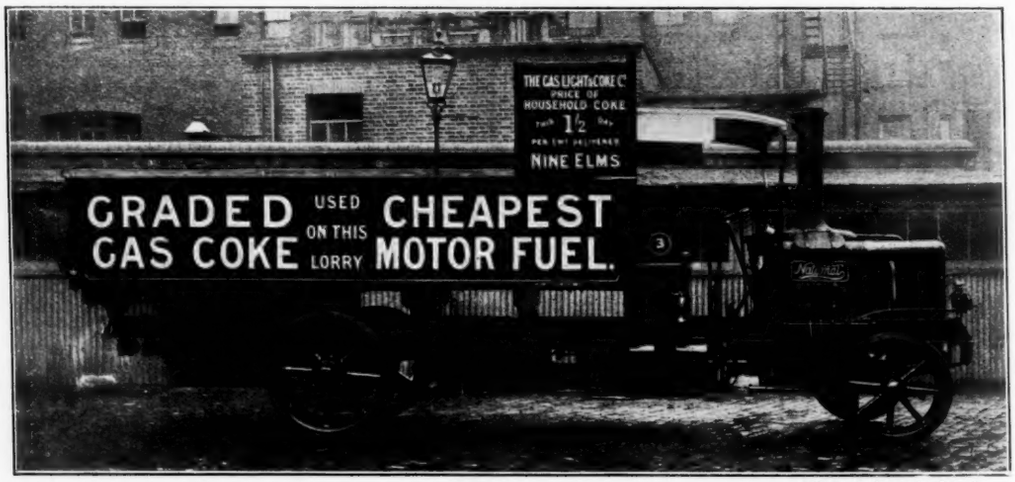
Another furnace which is worthy of mention is an annealing furnace, also fitted with Brayshaw's patent burner, and used for all purposes of annealing or case-hardening. The temperature is under complete control, and can easily be maintained within 5° C. in any part of the furnace from end to end. They are made in standard sizes up to 20 feet in length, and the admission of the combustible mixture is so arranged that a non-oxidizing atmosphere is readily obtained. In regular work, these furnaces prove most economical and satisfactory. The users of them realize the importance of being able to obtain a non-oxidizing atmosphere by the absence of scale on articles under treatment.

The importance which has of recent years been given to the question of quenching steel of all classes so as to obtain the best results has been considerable; and in the evening Mr. Shipley N. Brayshaw gave an instructive and lucid lecture on the subject. The various factors which are of importance in considering a quenching medium were enumerated under five separate heads: Specific gravity, specific heat, boiling point, conductivity, and fluidity. The lecturer thoroughly explained to the large audience the importance that should be given to the subject. After years of experiment he had come to the conclusion that while with extreme care fairly satisfactory results might be obtained by using water, yet to obtain a greater certainty of result, and to eliminate the human factor, something more was necessary; and he had found that by using a suitable mixture of fusible salts, which became fluid at comparatively low temperatures, the results obtained were all that could be desired. To use these salts it was only necessary to melt them at the commencement of the day with an ordinary bunsen burner, and the heat imparted to the liquid by the quenching of the tools was sufficient to maintain the fluidity for the rest of the day. Baths of every size suitable for using these salts were on view in the exhibition.

Professor Henry Louis, of the Armstrong College of Science, in seconding a vote of thanks to the lecturer, expressed his great appreciation of the information given, and stated that to his knowledge in many cases locally the output from machines was less than it should have been, owing to the failure of cutting tools to stand-up to their work through improper hardening.

Many of the furnaces on exhibition are fitted with pyrometers manufactured by the Cambridge Scientific Instrument Company, so that an operator can see at a glance the exact temperature at which the furnace is working; and as the various grades of steel require different temperatures, this is a very important factor in their successful treatment.

THE "CLARKSON" COKE-FIRED MOTOR.



[*Photo. by Percy F. Coggin.*

In the course of a letter received from Mr. E. W. L. Nicol, the Fuel Expert of the London Coke Committee, reference is made to the very energetic interest shown by the electrical industry in promoting the use of electric accumulator vehicles; and he suggests that the advantages of the coke-fired steam-motor might with profit to the gas industry be brought to the notice of the public. With this object in view, Mr. Nicol sends a photograph showing the lines upon which the gas companies associated on the London Coke Committee are endeavouring to do this.

The "Freight Exchanges Department" recently instituted by the "Times" newspaper [*ante*, p. 320] on the suggestion of our contemporary, the "Commercial Motor," opens up new and great possibilities for the development of long-distance motor-haulage—its object being, it may be remembered, to secure beforehand a full load for the return journey.

The special features in the design of the "Clarkson" National Coke-Fired Motor, as shown—*i.e.*, low fuel consumption and exhaust steam condensing outfit—give it a range of action that would be quite impracticable with the electric battery vehicle.

BRITISH COMMERCIAL GAS ASSOCIATION.

Report of the Executive Committee.

At the meeting on Wednesday last of the General Committee of the British Commercial Gas Association, the Executive Committee submitted the following report on their work since the 23rd of March. After mentioning that three new subscribers have been added to the list, they dealt with the question of

District Membership Committees.

District Membership Committees have been formed in the Manchester district and in Wales; and negotiations are in satisfactory progress for the formation of similar Committees in the other districts. The Manchester Committee have arranged, with the co-operation of the Blackburn Gas Committee (who at present are not subscribers), for a meeting to be held in the Blackburn Town Hall to-morrow (Wednesday), to which will be invited representatives of the non-subscribing undertakings in the district. In both the Manchester district and Wales special letters are being sent from the subscribers to the non-subscribers, pointing out what has been (and what is being) done by the former for all the undertakings in the district, and appealing to the latter, as neighbours, to bear their share of the cost.

Interim Accounts and Balance-Sheet.

A statement was submitted of the accounts and a balance-sheet for the first half of the financial year commencing Oct. 1, 1914. The accounts presented no exceptional feature other than the saving of expense through the abandoning of the annual conference, and a reduction in sales, which fell off considerably in the autumn owing to the uncertainty created by the war, but have since revived satisfactorily. Considering the very exceptional conditions prevailing during the period covered by the accounts, the Committee consider that the figures may be regarded as very satisfactory. The apparent reduction in the contributions of the manufacturers was due to differences in dates of payment. There was, fortunately, no reason to anticipate a reduction in the total for the completed year.

Advertising the Industrial Uses of Gas.

As foreshadowed in their previous report, active steps have been taken by the Executive to bring to the notice of manufacturers throughout the country the advantages of gas for light, heat, and power, in factories and workshops, so as to ensure the extended adoption of gas in this time of industrial re-organization and improvization. In addition to using "industrial" copy in the General Press, advertisements have been inserted in the papers specially devoted to the engineering and metal trades—namely, "American Machinist," "Engineer," "Engineering," "Machinery Market," "Metal Industry," and the Engineering Supplement of "The Times." As a result it is stated that a large number of valuable inquiries from firms of good standing have been received, by personal application as well as by correspondence, and good orders have been obtained as a consequence. A notable feature has been the number of interested inquiries received from those engaged in teaching in technical schools. This means the sowing of seed that will bear fruit in later years; for the pupils of to-day become the engineers and managers of the morrow.

Honorary Members of the General Committee.

It is recommended that, with a view to maintaining and extending their interest in the work of the Association, all Past-Presidents and Vice-Presidents should be invited by the General Committee to attend their meetings as honorary members—that is, without power to vote.

Institution of Water Engineers.

The Twentieth Summer General Meeting of the Institution is announced to be held at the Geological Society's Rooms, Burlington House, on Friday of next week. It may be remembered that the meeting was originally intended to be held at Belfast under the presidency of Mr. F. W. M'Cullough, M.Inst.C.E.; but in consequence of the present war conditions, it was considered advisable that the Irish visit should be deferred awhile. At next week's meeting the following two papers will be read and discussed: "The Effect of Springs upon Water-Levels in the Chalk of Eastern Surrey," by Henry Dewey, F.G.S. (H.M. Geological Survey); "The Hydro-Geological Conditions of Newbold, East Yorkshire," by Percy Griffith, M.Inst.C.E., F.G.S. Beyond this, the President, Mr. M'Cullough, will present a short report upon the work of the Institution during the past year.

Badische Aniline Works Bombarded.—The official *communiqué* from Paris last Thursday week contained some account of the bombardment, that morning, by a French air squadron, composed of eighteen aeroplanes, each carrying heavy projectiles, of the Badische Anilin und Soda Fabrik at Ludwigshafen, which is now one of the most important factories of explosives in Germany. Several buildings were struck, and fires broke out in many places. The extent of the work carried on in these works may be judged by the fact that there are employed 217 manufacturing research chemists, 142 civil engineers, 918 officials in the commercial department, and since the war 24,000 workmen.

ELECTRICITY SUPPLY MEMORANDA.

Over their electricity consolidation scheme for London and its environs, the County Council are in somewhat of a quandary; and it looks as though they will have to start *de novo*, if any success is to be achieved when Parliament is inclined to take up the matter, which is not likely to be until the war comes to an end. From the very first, the County Council took the almighty course, on the "we propose and dispose principle," which is that which has been pursued by the inglorious Kaiser. But such bodies and persons invariably come a cropper, and find that there are other people in the world besides themselves who claim, and who can compel, proper consideration. The history of the County Council scheme is known to our readers—how it was drawn up; how nobody knew what was actually contemplated except the Special Electricity Committee of the Council, until the Bill was published; how outside County Councils, with borough councils, municipal corporations, and electricity supply companies resented this treatment; and how, when they saw the scheme, there was a massing of forces against it. Then came the defeat in the Council on the motion for pursuing the promotion of the Bill, followed by the resolve of the Government not to take up such contentious matters this session. The County Council have had time for quiet meditation since then; and the Special Electricity Committee who produced the wonderful scheme with its hypothetical benefits have issued from the consideration of their position in quite a chastened spirit. Spurred on by certain of the Borough Councils owning electricity supply undertakings, a conference was convened, and was held recently, between the Committee and the Metropolitan Borough Councils and the Electric Companies. There has been little allowed to transpire as to what happened at the conference; but "Electrical Industries" says that the main outcome was a resolution that Committees should be formed of representatives of the Borough Councils and Companies and the County Council Committee, for the purposes of consultation and the formulation of a scheme. This means retracing steps to the very beginning of things, and working-up a fresh scheme which will be acceptable to all parties. The plurality of committees does not look very promising. Complication of the kind is not going to produce anything very great; and whatever is done is not likely to meet with the unanimous approval of all concerned. So London will go on, and on, and on, in this matter of the concentration of electricity supply; and so far as the prolonged discussion has thrown light upon the position, London will profit thereby.

A Fresh Start.

The visionaries of the electrical industry are marvellously good at allocating to their own and to our industry their respective future spheres of operation. But we have never been able to see eye to eye with them regarding the line of demarcation. At one time, they were to have all the lighting and the power, and we the cooking and heating. This allotment was declined with thanks, seeing that lighting and power form very valuable parts of the gas industry's trading. Since then the electrical industry has been playing about on the borders of the large business of cooking and house and water heating; but the success of the electricians in these lines of business is terribly limited by the low thermal value of their commodity, and the indifferent character of their appliances. But they make believe that they are bubbling over with optimism in these directions. Meantime in them all the gas industry's business curves ascend to higher and still higher peaks. The lighting business is as large in bulk as—
—indeed larger than—it was in 1882; and the gas power business has made a big stride forward. Manufacturers have been finding out for themselves the respective spheres in economy and usefulness of the gas-engine and the electric-motor. The makers of gas-engines have continued to do a magnificent business, and have had to extend their shops; and there has been a fresh spurt in the adoption of the gas-engine with town gas in the industrial areas, where less is heard now of suction-gas plant. The higher prices of town gas through the war have not affected so much contract power supplies as ordinary lighting supplies; and the extensive application of gas for furnace work the last few years, and particularly since the war started, will also be to the advantage of the use of town gas for power, as the two combined will do much towards securing larger discounts according to the volume of the individual industrial demand. Then in regard to lighting, high-pressure and low-pressure inverted lamps have obtained a tremendous use in factory lighting. Therefore against the old allocation of spheres for the two industries, both are operating with ardour, and will do so with still greater vigour when the war is over, and the prices of their commodities descend to a more normal state.

Respective Spheres.

Now "Meteor" of the "Electrical Times" has joined the visionaries, and he proposes to limit still more the activities of the gas industry. He is graciously pleased to suggest that the gas industry should devote itself to the carbonization of coal, work-up the chemical products, and send the gas for consumption beneath the boilers at the electricity generating station. The world is not prepared to forego, in this drastic manner, the immense usefulness and potentialities of gas. "Meteor's" suggestion

In Futuro (?).

lacks the instinct of the economist. "It is positively wicked," he says, "to burn coal under a boiler." Agreed. "One ought only to burn the gas"—we take it he means under the boiler. With this there is disagreement. If steam is preferred for electricity generation, the greater economy lies in burning under the boilers the chief secondary product of coal carbonization—coke. Otherwise, the less circuitous route to the production of electricity is to send the gas direct into the cylinder of a gas-engine. "Meteor" is raising the old idea of collaboration between the gas and electricity industries. But he would circumscribe the activities of the gas industry to the supplying of fuel to generating-stations, and to looking after the secondary products, and so rob the world of a vast economy by compelling the use of electricity. This is apparently what he means, if anyone chooses to take him at all seriously, which no one is very likely to do. The Wood Green electricity generating station of the Tottenham, Light, Heat, and Power Company prompted him to pen the paragraph. "A similar gas and electrical combination, under precisely these same conditions, has never," he thinks, "been attempted before." Perhaps not under "precisely" the same conditions, but conditions not far removed from them. There are various gas companies now operating gas and electricity concerns in combination—some generating electricity by means of their own gas supply. There are many gas undertakings producing energy in the same manner for their own works; there are not a few who have put down private generating plants for large consumers of electrical energy, and are supplying gas to the engines. One correction with regard to a partial misconception on "Meteor's" part as to another matter. "In war time," he says, "bye-products suffer from certain disabilities, but normally they represent a most lucrative kind of business, and one not wholly developed hitherto." The bye-products of gas manufacture did suffer at the beginning of the war from "certain disabilities." Pitch is still doing so. But the other products to-day—well the revenue that is being derived from them, and this is war time, is not to be sneezed at.

Heating and Ventilation.

The electricity supply industry, as recent references have shown, has lately been considering the question of heating and ventilation by means of electric fans and the roasting of the incoming air by passing it over electrically heated elements. Now, the "Electrical Times" has given an account of the "Credenda" system of electric heating and ventilation—a sample of which has been installed at the show-rooms of Messrs. Baxter and Caunter, of Tottenham Court Road. It seems, however, that the premises are not the most suitable for demonstrating the system; so that it would appear that the latter has its limitations. From the description, too, judgment suggests we should much prefer to sit in rooms warmed by radiant heat, with the combustion of the fuel assisting in the changing of the air, than in a room heated by the new system. We extract from the description these particulars: In the basement is an enclosed electrically driven centrifugal fan, which draws cold, fresh air from outside the building. Between the fan and the air-inlet is a metal horizontal cylinder 24 in. long by 17¼ in. diameter, and in this are placed resistance coils of nichrome wire, wound over porcelain formers, and operating at a dull red glow. The elements are interconnected with the starting rheostat of the fan, so that they cannot be switched on without at the same time putting the fan in motion. In this way overheating of the resistance is said to be obviated. The fan changes the air in the show-rooms, staircase, and corridors (which together have a capacity of 16,000 cubic feet) only twice every hour. At full heat the elements are loaded to 10 KW.; three switches mounted on the drum casing giving four changes of heat control. After being drawn through the heating chamber, the warmed air is discharged through a lagged duct and branches to six outlets placed at the floor-level of the show-room. With an initial temperature of 46° Fahr., the heater at full load (10 KW.) will raise it by 12·5° Fahr. throughout the premises within an hour and a quarter; and this temperature is maintained for an expenditure at the rate of 4 KW. With the outside air at a slightly higher temperature, 2 KW., it is said, would be ample to keep the air at 58° Fahr. or thereabouts. It is understood by our contemporary that the equipment has displaced two large coal fires and a 1-KW. electric radiator. The system does not strike us as either economical or efficient in comparison with what can be done by other means; and the humidity of the atmosphere must be greatly affected.

Arehitects' Report on Electric Cooking.

There has been published a vague sort of paragraph in the "Cooking and Heating Notes" in the "Electrical Times," stating that it has been decided to adopt electricity for cooking purposes, as well as for lighting, pumping and motive power, at the Hampshire County Asylum, now being erected at Park Prowett, near Basingstoke. But later on it seems that the decision as to cooking is confined to "auxiliary" cooking plant—whatever this may mean. It appears that the architects have been feeding freely on the stock arguments of the electricians regarding electric cooking, until they feel disposed to commit the County Asylum to a large experiment, although confessing that they have not heard of any electric cooking installations in large institutions. But from what they have "seen," there does not "appear" to be any serious difficulty or objection in "trying" electric-ovens in the new kitchen. We cannot vouch for the quoted words being those of the architects; but they are in the paragraph before us. Then to the architects the statement is attributed that the advantages of roasting electrically are "cleanliness, adaptability, efficiency, and economy." Again, "there being no combustion, about 15 per cent. of the meat is saved." We do not understand this reference to "combustion" in relation to the saving of meat; and we should like the architects—Messrs. G. T. Hine and Pegg—to enlighten us. They may further be recommended to read Mr. Cooper's paper recently submitted to the Institution of Electrical Engineers, together with the confessions made by electricians in the course of the discussions in London and by the various sections. We shall also be pleased to forward to the architects for consideration our reviews of certain recently published electric cooking books. The point as to shrinkage, they will find is absurb. Shrinkage of meat is entirely a question of the cooking temperature and the time taken in the operation, and not an effect of the method employed. With gas-ovens the temperature can be regulated to high or low or any intervening degree just as desired. Then the architects are credited with the statement that electricity at 1d. per unit will compete with gas at 2s. 6d. per 1000 cubic feet. Who told them so? And what evidence have they to advance that 3420 B.Th.U. obtained electrically can compete with upwards of 16,500 B.Th.U. realized by the combustion of a penny-worth of gas? We should like to discuss these matters with Messrs. Hine and Pegg, through the "JOURNAL" columns, if they are prepared to attempt to substantiate the various statements as presented in the paragraph before us.

The War and Electricity Supply in Germany.

The electrical industry of Germany had a varied financial experience during 1914. The year, of course, does not give a fair indication of the full effects upon business of the war, seeing that the first half of the year helped to conceal them. Generally speaking, the accounts of the plant manufacturing firms show a decline of net profits and reduced dividends, though a few concerns are able, owing to their financial strength to pay the same dividends. There are instances, too, of even higher profits having been earned, through the requirements of the country in regard to materials. The "Electrical Review" publishes examples of the results of the working of a number of the concerns, included among which are instances of the effects upon the electricity business. There is the Elektrizitats Lieferungs Gesellschaft, of Berlin—a company owning 21 electricity supply works, and leases of several others. This Company report that the development of business was satisfactory until the war, when a contraction took place; but shortly afterwards a favourable course was resumed by most of the works. The scarcity of petroleum which occurred exercised a stimulus on the supply of the electric light, and brought many additional customers to the Company. It was of advantage to the Company that, with the exception of the works at Craiova (Rumania), all the undertakings were situated in Germany. The accounts indicate gross profits of £287,000, as against £310,000 in 1913, and net profits amounting to £179,000, as compared with £213,000. It is proposed to pay a dividend of 10 per cent. on the ordinary share capital of £1,500,000, as contrasted with 12 per cent. in 1913. The loan capital totals to £1,450,000. Then the Gesellschaft für Elektrische Unternehmungen, of Berlin, who have an ordinary share capital of £3,000,000 and loan capital of £2,023,000, own, or are otherwise financially interested in, many lighting and tramway undertakings both in Germany and in Russia, France, and other countries. The report for 1914 states that, with few exceptions, the supply works in the homeland have been prejudiced in their development through the war, while those in neutral countries have been similarly affected to a lesser degree. The tramway undertakings have suffered to a greater extent. On the other hand, the undertakings in hostile countries, particularly in Russia, have been placed under State control, although it is impossible to form a definite opinion as to their ultimate fate. The accounts indicate net profits amounting to £261,000, as against £318,000; and it is proposed to pay a dividend of 6 per cent., as compared with 10 per cent. in each of the three preceding years.

Copper and Electricity Supply.

Electricity supply undertakings have not had a happy time the last few years in regard to the price of copper. Their annual outlay is largely affected by the prices which have to be paid for structural materials; high expenditure in this direction naturally influencing capital charges. The course of copper stocks and prices during the twelve months ending with April last was somewhat peculiar in view of the war. In May last year, the stocks of standard copper in Europe and afloat thereto from Chili and Australia (Mr. John B. C. Kershaw shows in "Electrical Industries") were about 30,000 tons; and the price was then just below £64 per ton. By the end of July the stocks had gone up to close upon 35,000 tons, and the price had fallen to just below £57 per ton, at which figure it stood until the end of September. A peculiar thing was that the stocks of standard copper then crept up slowly until about (say) 36,000 tons were reached at the end of October, during which month there was a sharp decline in price to nearly £50. But this was only a fall preceding a sharp ascent; for although there has only been a gradual decline of stocks to (say) about 29,000 tons, the price has shot-up from the figure of about £50 per ton at the end of October to about £73 per ton at the end of April. This is not a happy position.

LIGHTING AND COOKING BY GAS AT MILITARY HOSPITALS.

An Illustration at the Orchard Military Hospital, Dartford.

In the equipment of military hospitals, convalescent homes, and camps in connection with the war, the gas industry has been able to contribute largely by the rapid provision of means for lighting, cooking and heating. There are five essentials in the furnishing of such places with means for lighting, cooking and heating; and they are constancy, controllability, economy, efficiency, and labour-saving. Gas embraces the whole of these essentials, supplemented, if need be, by coke-heated boilers for the provision of hot-water in bulk, and steam if required. The recognition of the superiority of gas operation through the combination of these important essentials has created for it the large popularity that it has enjoyed in ministering to the special service of the country, during the training and mobilization of troops, and now in the work of the hospitals and convalescent homes.

We have referred in previous issues, in a more or less incidental manner, to the gas equipment of some of these places. There is a good illustration in the Orchard Military Hospital at Dartford, which is one of a block of four hospitals—the other three not being used for military purposes. The Orchard Hospital was, directly after the outbreak of hostilities, taken over by the military authorities, from the Metropolitan Asylums Board. Its general equipment is splendid, and absolutely perfect in every detail; and when it is mentioned that there is accommodation in the establishment for 1200 men and a staff numbering 300, it will be appreciated that the lighting, cooking, and heating requirements are of no small order, and that gas takes a prominent part in the daily work.

ONE OF THE WARDS AT THE ORCHARD HOSPITAL, DARTFORD.

Prior to the hospital being taken by the military authorities, it had not been in use for some years; and it was therefore still fitted throughout with flat-flame burners. But the military authorities placed the question of improved lighting in the hands of the Dartford Gas Company; and the lighting in the wards, kitchens, laundry, dispensary, staff quarters, recreation room, and the theatre (the theatre has accommodation for 400 persons) was speedily transformed to modern conditions in the matter of efficiency. The change in the lighting arrangements necessitated the installation of 750 universal and intermediate porcelain inverted gas-burners. The illuminating effect of these is excellent.

With regard to the gas-cooking apparatus, in the main kitchen there are two gas-ovens, each measuring 5 ft. by 2 ft. 9 in. by 2 ft. 6 in., and two others each measuring 5 ft. by 2 ft. 9 in. by 3 ft. 9 in., two treble-oven cookers, and one twin cooker. The various ward kitchens are also fitted up with a total of 44 small gas-cookers for the use of the nurses in the special and night preparation of food. In the laundry, three large gas-heated ironing-machines are in use. All the sterilizers in the hospital are also heated by gas. These particulars show that we have here a considerable gas installation; and it is another testimony to the favour in which gas is held for extensive requirements of this kind.

RECREATION ROOM AT THE ORCHARD HOSPITAL, DARTFORD.

For the two illustrations, which give some idea of the magnitude of the hospital, we are indebted to the Kentish District Times Company, Limited, of Sidcup.

Flue Gases for Extinguishing Fire in Coal.

At a recent meeting of the Sydney Section of the Society of Chemical Industry, Mr. George Harker, D.Sc., described an apparatus which is being successfully used for extinguishing fires in ships' holds by means of flue gases. The gases are drawn from the ship's funnels by means of a fan, passed through a special water cooler and cleaner, and delivered to the holds by means of pipes. Mr. Harker remarked that by tests at a plant recently installed in London, and carried out by Mr. F. Edwards, it had been conclusively proved that coal fires can be so extinguished. The result bears indirectly on the question of the spontaneous combustion of coal. When a confined volume of air is left in contact with coal dust, a large proportion of the oxygen will be removed from the air after several days' contact. In one experiment with a sample of bituminous coal, in which a flask was filled with the finely-ground coal and left to stand in a room at summer temperature for a fortnight, the gas in the flask showed, on analysis, only 4·86 per cent. of oxygen and less than 1 per cent. of carbon dioxide. The conclusion has been drawn by some authorities, from experiments such as these, that in order to extinguish a mass of coal on fire the atmosphere surrounding the coal must be entirely devoid of oxygen. But the absorption of oxygen by the bituminous compounds of the coal is quite a distinct process from the combustion of the coal, accompanied by the rapid production of carbon dioxide and water. In the experiments conducted by Mr. Edwards, in which a large mass of glowing coal was extinguished, the proportion of oxygen in the flue gas was about 9 per cent. Coal when burned under specially suitable conditions can produce a flue gas containing as little as 4 per cent. of oxygen; but, as has been pointed out by Professor H. E. Armstrong, the application of a gas containing 10 per cent. of carbon dioxide and 10 per cent. of oxygen, instead of air with 21 per cent. of oxygen, immediately slows-down the combustion, and produces a cooling effect.

PERSONAL.

Mr. JAMES B. STEWART, the District Superintendent of gas mains and services at Glasgow, has been appointed Outdoor Superintendent of the Rochdale Corporation Gas Department.

On Wednesday last, the marriage was solemnized of Miss GERTRUDE SMITH, the elder daughter of Mr. A. H. Smith, the Gas Engineer to the Darwen Corporation, and Mr. PERCY H. YATES, the eldest son of Mr. William Yates, of Darwen.

Mr. ERIC DOUGLAS STOKES, the elder son of Mr. Albert Stokes, of Streatham, Chief Inspector of the South Metropolitan Gas Company, has been given a commission as Second-Lieutenant in the 3rd Battalion the 6th City of London Regiment.

While the guest of the Association of Technical Institutions at dinner in the Carpenters' Hall, London Wall, E.C., Sir PHILIP MAGNUS, M.P., was presented with an address in which, on the occasion of his retirement from the active direction of the Department of Technology of the City and Guilds of London Institute, the Association expressed high appreciation of the eminent services which he had rendered to the advancement of technical education since his appointment 35 years ago. The address was accompanied by gifts of a scarf pin to Sir Philip and a silver urn to Lady Magnus.

The Spalding Urban District Council, at their meeting last Wednesday, appointed Mr. C. J. ROBINSON, the Assistant-Manager of the Gas Department of the Ilkeston Corporation, to the vacant position of Engineer and Manager of the Spalding Gas-Works. Mr. Robinson started his professional career at the Ilkeston Gas-Works some twenty-five years ago, and has steadily worked his way up to his present position—in doing so, acquiring a general and practical experience. He expects to commence his duties at Spalding on the 1st prox. The successful candidate was selected out of fifty applicants.

From a list of thirty-two candidates the Sheffield United Gas Company have filled the appointment of Superintendent of their Neepsend works by selecting Mr. ROBERT NEILL, who is at present Assistant to Mr. W. J. Smith, the Engineer of the Bolton gas undertaking. Mr. Neill has held the position at Bolton for about three years, previous to which he was for a year Assistant-Engineer to the Whitwood Chemical Company, and was eleven years with Messrs. R. & J. Dempster, Limited. The Neepsend works, it may be mentioned, have a capacity of between eleven and twelve million cubic feet per day.

OBITUARY.

The "Journal für Gasbeleuchtung" of the 22nd ult. reported that the death occurred on May 5, after a long illness, of Herr VICTOR JOHAE, the Manager of the Gas, Water, and Electricity Works of the Corporation of Viersen. Deceased, who had been in charge of the gas-works since 1907, was in the prime of life.

Among the most recent casualties at the front is included the name of Mr. BRYAN CROSSLEY, a Director of Messrs. Crossley Bros., Limited, of Manchester. The deceased was the second son of the late Sir William Crossley, Bart., and the only brother of Sir Kenneth Crossley, Bart, the present Chairman of the Company.

It is with regret that we have to announce that Mr. George J. EVESON, the Managing-Director and Founder of the G. J. Eveson Coal and Coke Company, Limited, of Birmingham, passed away at his residence, Shepley Manor, Barnt Green, last Thursday morning. Mr. Eveson was 70 years old. The funeral took place yesterday afternoon at Lickey Church, Barnt Green.

Mr. R. S. TRESILIAN, the Secretary of the Dublin United Tramways Company, whose death is announced, was also a Director of the Alliance and Dublin Consumers' Gas Company, and took a great interest in the work of reorganization which has been going forward in connection with the latter Company's undertaking. Deceased, who had passed his sixtieth year, had been ill for only a few days.

Mr. R. W. SMITH SAVILLE, the Borough Engineer of Darwen, died at his residence on Tuesday last, after two or three months' illness. Mr. Saville went to Darwen from Burton-on-Trent in September, 1896, when he was appointed successor to Mr. W. Stubbs. During the time he held his appointment he carried through many important schemes for the betterment of the borough, and played a prominent part in the taking over of a supply of water from the Bolton Corporation.

A new gas-fired furnace for hardening, tempering, or annealing long metallic bodies, such as axles, gun-barrels, tubes, connecting-rods, &c., has recently been produced by the Monometer Manufacturing Company, Limited, of Aston, Birmingham, and is described and illustrated in the current number of the "Engineer." Long metallic bodies are peculiarly susceptible to distortion when being heated or cooled. In the new furnace, arrangements have been made which, it is claimed, completely eliminate distortion and scaling. The furnace is so designed that the metallic bodies during heating and quenching are suspended in a vertical position, and are protected from direct contact with the flame.

CLAY AND POTTERY INDUSTRIES.*

THIS book consists of a collection of fifty-two miscellaneous papers mostly dealing with the characteristics and testing of clays and glazes. Dr. J. W. Mellor, either alone or else in conjunction with some other investigators, is responsible for all the papers; and most of them have been previously published in one place or another at some date within the past decade. They all emanate from the County Pottery Laboratory of Staffordshire, of which Dr. Mellor is the distinguished head. It is intended that further volumes shall be issued from time to time. We do not know of any higher authority than Dr. Mellor on the subjects discussed in the book under review; and the published accounts of his investigations have already been helpful in revealing the causes of the unexpected behaviour of certain refractory materials under the influence of heat.

A few of the papers included in the book are of very little interest at the present time. Paper LI., for example, is a reprint of an address on "Technical Education and Foreign Competition" delivered in the year 1896; and Paper LII. is a reprint of an address on "Technical Education in the Old-Established Industries," delivered at an annual prize distribution in the same year. Both these papers might have been omitted without materially detracting from the value of the book. There are also, of course, papers which are likely to be serviceable to potters, but which will not interest the majority of gas engineers. On the other hand, several of the papers will be of great assistance to the gas industry as a guide in the construction of more durable retorts and fire-bricks. Paper L., on "Refractory Materials in Gas-Works," which is a reprint of a lecture which Dr. Mellor delivered last year before the Manchester District Junior Gas Association, is of the first importance to gas engineers, and is well worth preservation for reference. In this paper it is shown, among other things, that the softening temperature of a fireclay is reduced when the clay is fired under a load, and that the greater the load the lower is the apparent softening temperature. Dr. Mellor's electric furnace for testing refractory clays under different loads is here described and illustrated.

Another paper of particular interest to many "JOURNAL" readers is No. XVI., on "The Rational Analysis of Clay." In this paper Dr. Mellor refers to Mr. Bywater's communication to the Institution of Gas Engineers in 1908, and clearly shows that the rational analysis of a clay on the lines adopted by Seger and others (which Mr. Bywater prefers to an ultimate analysis) is of little value. No method of making an accurate "rational" analysis is known. Dr. Mellor says that his remarks "are directed solely against the idea that the process of rational analysis indicated by Mr. Bywater can be applied to fireclays in general," and the writer of this review thinks that the facts adduced by Dr. Mellor in support of his views are conclusive. He is undoubtedly right in saying that the results furnished by the methods of rational analysis at present in vogue are unreliable and are frequently false.

The title of Paper XV. is "The Action of Heat on Refractory Materials." Here figures are given which show that fireclays exposed to high temperatures lose a large proportion of their potash and soda, and also a small proportion of their alkaline earths; so that after prolonged heating the clay becomes more refractory. It is stated that the volatilization of the alkalies and alkaline earths is greater when the clay is fired under reducing conditions or in an atmosphere of water vapour. As water vapour and reducing gases are present in gas-retorts during the carbonization of coal, it is probable, therefore, that the alkalies in the retort material are volatilized at a comparatively rapid rate. The loss of alkalies and alkaline earths by volatilization is not, however, entirely a good thing; for although it causes the clay to become more refractory, it also causes it to become more brittle, because the lime, potash, and soda act as cementing or fluxing agents. Another fact which causes heated fire-brick to become gradually more brittle is the tendency of the fireclay to crystallize, and to crystallize *irregularly*. Great strains are in consequence set up in the body of the brick, which render it more liable to rupture. A vitreous solid decreases in volume when it changes to a crystalline condition. Some interesting photographs are reproduced which show the changes effected by prolonged heating in the structure of pyrometer tubes. A tube made of quartz becomes devitrified, and crystallization occurs. A similar change takes place in tubes made of porcelain, but unglazed magnesia pyrometer tubes do not undergo any marked change.

In Paper XXVII., on "The Speed of Vitrification of Clays," Dr. Mellor rightly points out that when the temperature at which a clay will begin to fuse is determined by means of Seger cones, it is necessary to take into account the rate of the rise in the temperature of the bodies. If cone and clay be heated slowly the result may be different from that obtained when the cone and clay are heated rapidly. The speed of vitrification of the two bodies may be the same at one temperature, and yet different at a higher temperature.

Paper XXXVIII. discusses "Fireclays and Fire-Bricks." Referring to the necessity of using well-shrunk fire-bricks for the

* "Clay and Pottery Industries." Being Vol. I. of the Collected Papers from the County Pottery Laboratory, Staffordshire. By Several Authors. Edited by J. W. Mellor, D.Sc. London: Charles Griffin and Co., Limited; 1914.

walls of a furnace, and the frequent appearance of blotches in fire-bricks, Dr. Mellor says that a thoroughly shrunk fire-brick has not usually so pleasing an appearance and colour as one less perfectly shrunk. The well-fired brick often has small blotches, owing to the formation of iron scabs at the high firing temperature. Yet the fire-brick manufacturer, says Dr. Mellor, can sell the less perfectly shrunk brick under conditions where a brick made from exactly the same material would be rejected on account of its blotched appearance. The blotches are a blemish, but some of the best fireclays have them in abundance when properly fired. It does not, however, follow that a brick that is blotched is necessarily a thoroughly shrunk and good brick.

It will be seen that, although the book is published for the benefit of the clay and pottery industries, it contains much matter that may be profitably studied by all concerned with the use of furnaces or retorts.

ASSOCIATION OF STATUTORY INSPECTORS OF GAS-METERS.

The Provisional Committee of the proposed Association of Inspectors of Gas-Meters presented their report at a General Meeting held last Wednesday at the County Hall, Spring Gardens, London—Mr. G. HUME (City of London), the Chairman of the Provisional Committee, presiding. The Inspectors from the following districts attended: Greenock, Hull, City of London, London County Council, Leeds, County of Middlesex, Newcastle-upon-Tyne, Nottingham, Oldham, Sheffield, Southampton, and Reading.

The Committee anticipated the difficulty which many inspectors would have in attending the meeting, both from a consideration of distance and circumstances arising from the war. Therefore comment on the Committee's report, which had been circulated, was invited, and it would be taken into consideration. Quite a number of replies were received, supporting the adoption of the Provisional Committee's recommendations. This was only in accord with the nature of the replies which the Committee had considered in drafting their report. Replies to the inquiry circular had been received from the following districts: Aberdeen, Bath, Birmingham, Bolton, Bradford, Brighton, Bristol, Carlisle, Cork, Coventry, Derby, Dublin, Dundee, Edinburgh, Exeter, Glasgow, Gloucester City, Greenock, Hereford, Hull, Leeds, Leicester, Leith, Liverpool, City of London, Spitalfields, Newington, Clerkenwell, Manchester, Middlesbrough, County of Middlesex, Newcastle, Newport, Nottingham, Oldham, Perth, Portsmouth, Preston, Reading, Salford, Sheffield, Southampton, Worcester, and York.

The CHAIRMAN, before proceeding to discuss the report, expressed the feelings of the majority of inspectors in so far as the Association, he thought, would prove to be a source of usefulness as a means of inspectors getting to know more of the methods employed at stamping offices where large numbers of meters were dealt with under the Sales of Gas Acts. He wished to assure them that any information desired would by this means, and others which the Committee proposed should be set up, be of advantage to all, and he felt sure that a good mutual understanding would be brought about. He expressed his regret that any inspector should have been prevented from attending through short notice. This had been unavoidable, inasmuch as it was desired that the meeting should be held about the date of the annual meeting of the Incorporated Society of Inspectors of Weights and Measures; and until the Committee received the Society's reply to the suggestion to form a section of gas-meter inspectors with the Society, the Provisional Committee could not draft their report. They all now knew that inspectors of gas-meters could not be admitted members of the Society until an alteration had been made in the rules. Before proceeding with the discussion on the Committee's report, he would ask the Secretary to read the summary of the particulars which he had procured for the Committee.

The SECRETARY remarked that further replies had brought the number up to 44; but at the present time, so far as he was in a position to know, there were 72 inspectoral districts for which the Board of Trade had issued Government stamps. Of this number, 17 appeared to be inoperative. Thus there were 55 districts in operation in the kingdom. The Board of Trade, however, recognize two inspectors—in two instances—with but one stamp, which thus brought the total number of inspectors appointed under the Sales of Gas Acts up to 57, of whom 20 were also Inspectors working under the Weights and Measures Acts. Of this total, there were a few who held dual appointments such as public lighting engineers, gas examiners, borough surveyors, city analysts, &c. It would not, of course, be unreasonable to say that the bulk of the meters examined, tested, and stamped under the provisions of the Acts were dealt with by inspectors who devoted their whole time to the duties, and probably the number of such districts would not exceed 40. In the year 1912, the number of meters tested by inspectors of weights and measures was not more then 39,000, whereas those of the other two-thirds of stamping officers totalled 850,000, or somewhere about 889,000 for the kingdom. There were 33 promises of support for the Association. Of this number, 14 were also inspectors of weights and measures. The subscription most favoured was one of 5s. per annum.

After discussing these different matters—mostly from the point of view of inspectors of weights and measures, and their Society—all were agreed that it would be a pity to let the scheme fall through, pending an alteration of the rules of the Society of Inspectors of Weights and Measures. It was therefore unanimously resolved to adopt the Provisional Committee's recommendations and form a separate organization, seeing there was nothing in the Committee's report against a union of inspectors of weights and measures and inspectors of gas-meters if at any time such a course was found to be possible and desired.

It was resolved to name the organization the "Association of Statutory Inspectors of Gas-Meters."

It was further resolved to elect an Executive Council, to consist of the Chairman, Past-Chairman, Vice-Chairman, Treasurer, Secretary, and ten others, with power to draw up articles of constitution, and deal with any matter arising, and submit the same for adoption at the first annual general meeting of the Association on a date to be fixed by the Council about twelve months hence.

The officials and members of the Executive Council were elected as follows:

Chairman.—G. Hume, City of London.
Vice-Chairman.—W. Gordon, Edinburgh.
Treasurer.—J. L. Barry, London County Council.
Secretary.—F. Cox, Nottingham.
Members of Council.—W. T. Denton, Newcastle; S. Dyson, Manchester; G. W. Kay, Oldham; W. Kenyon, Sheffield; S. B. Langlands, Glasgow; F. Rolfe, London County Council; W. Templeton, Leeds.
Auditors.—H. Wright, of Reading; F. Goddard, London County Council.

The Council were empowered to fill the remaining vacancies.

The subscription was fixed at 5s. per annum.

The proceedings concluded with a vote of thanks to the London County Council for the use of the room.

"Field's Analysis" for 1914.

The forty-sixth year of publication has been reached by the valuable collection of statistics known throughout the gas profession as "Field's Analysis" of the accounts of the principal gas undertakings in England, Scotland, and Ireland. The statistics were originally compiled and arranged by the late Mr. John Field; and his labour in this direction has since been carried on by Mr. William Blakey, the Accountant to the Gas Light and Coke Company, who, in forwarding a copy of the issue for 1914, points out that the accounts of two more corporations—namely, Belfast and Widnes—have now been added. The price of the book has been increased from 15s. to 17s. 6d.; but the sum is still a small one for the large amount of valuable information it procures.

An Inopportune Request.

Touting for subscriptions for employees' beanfeasts, always an objectionable practice, is surely doubly so at the present time, when the mind of the nation is set on other things than "making merry." Yet a document which has reached this office shows that the employees of at any rate one gas company—it is to be hoped it is the only one—are sending to manufacturers an intimation in the following terms: "The annual outing and beanfeast of this company's employees takes place in July [the date not fixed]; and I have been requested on their behalf to ask you if we may have the pleasure of including your name on the subscription list now open for this year's event."

Bristol Staff and Employees' Good Example.

The Lord Mayor of Bristol (Mr. John Swaish) has been much gratified by the receipt of a handsome cheque from the staff and workpeople of the Bristol Gas Company for the relief funds of Belgium, Serbia, and Montenegro. The cheque was enclosed with a letter from Mr. John Phillips (Secretary) and Mr. D. Irving (Treasurer), stating that the official staff, foremen, and workmen at the different stations of the Company had resolved to forego their annual summer outing, and had decided to hand over the available fund to be divided between the relief funds for Belgians, Serbians, and Montenegrins. The writers, therefore, had the pleasure of enclosing a cheque for £103 2s. 6d., requested the Lord Mayor to be kind enough to undertake the work of distribution. Replying to Mr. Phillips, the Lord Mayor said: "I am grateful, not only for this money, but for the great generosity you have shown by your regular contributions for the Red Cross Society, and other kindly things you have done since the war began."

Mr. James Eglington Anderson Gwynne, who was formerly head of the well-known engineering firm of Messrs. Gwynne and Co. (manufacturers of gas-exhausters), and whose death was recorded in the "JOURNAL" for March 30, left unsettled estate of the gross value of £233,492.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

"Brain Picking" Expeditions.

SIR,—I have received from the Huddersfield Gas Department the following letter and inquiry form, which I enclose for your information, together with a copy of my reply.

It is my experience that, immediately after capable men are displaced, and a cheap form of management is installed in their place, the remainder of the profession are immediately inundated with numberless inquiries by the new form of cheap management, to which the members of the profession are, I suppose, to devote their time, which at present is very much occupied, in replying thereto.

I must enter a strong protest against these "brain picking" expeditions, and trust that we may receive your support against this kind of thing.

R. H. BROWN, Deputy-Engineer,
Birkenhead Corporation Gas-Works.

Birkenhead, June 3, 1915.

[ENCLOSURES.]

T. O. Paterson, Esq., M.Inst.C.E., Engineer
and Manager, Gas-Works, Birkenhead.

Dear Sir,—I should be greatly obliged if you would favour me by filling up the enclosed form, respecting the above subject.

The information given will be treated quite confidentially; and I shall be glad at any time to reciprocate by furnishing any particulars you may desire.—I am, yours faithfully,

HAROLD SINGLETON, Engineer and Manager.

STREET LIGHTING INQUIRY. TOWN.. .....

Have you automatic lighters? If so, what make? . . .
Are they a success; and how many lamps are attended by one man? . . . . . .
What are wages for attendants to clock-lighting? . . .
What charge is made for street lighting? . . . . . .
If lighted by torch, what is average distance travelled per man and number of lamps lighted? . . . . . .
What are wages of torch lighters? . . . . . .
Are all or a portion of lamps extinguished before sunrise?
If so, at what time, and what proportion of the lamps, and in which portions of the town? . . . . . .
Who is the authority responsible for lighting and maintenance? . . . . . .
What is candle power supplied or quantity of gas per hour per upright burner? . . . . . .
What is candle power supplied or quantity of gas per hour per inverted burner? . . . . . .

H. Singleton, Esq., Gas-Works, Huddersfield.

Dear Sir,—In the absence of the Gas Engineer, on sick leave, I have received your circular letter, *re* "Street Lighting."

I regret I feel unable to fill up this form, as I am in agreement with the very strong resentment which exists amongst gas engineers at the action of the Huddersfield Council in their treatment of Mr. Harman, and with the manner in which they filled up the appointment. As to my opinion of the gentlemen who assist such councils in the degradation of the gas profession, the less said the better.

In any case, I am not assisting the Huddersfield Council and their officials in brain-picking expeditions.—Yours faithfully,

R. H. BROWN, Deputy Gas Engineer.

Birkenhead, June 3, 1915.

Manchester Prosecutions for Dense Black Smoke.

SIR,—It occurred to me yesterday when discussing black-smoke troubles in Manchester that, if some of our gas engineering specialists would take the trouble to look up a few of the firms who are being fined here for this nuisance, the "culprits" might become converts to the use of gas-furnaces. At all events, two firms out of four who have of late appeared at our local Police Court are open to consider suitable gas plant. The electricity people are very keen on this sort of thing.

J. H. L.

Manchester, June 3, 1915.

Aspects of Co-Partnership.

SIR,—Referring to the "Editorial Notes" in your issue of May 25, I do not read anything that refutes my contentions, unless it be the references to zoology and the personal character of the Kaiser in the last paragraph.

I am obliged by your correction of my error in assuming that proprietors are entitled to a minimum 4 per cent. dividend. However, it does not really affect the point, which is that co-partners may be wiped-out while proprietors are still in receipt of a good dividend.

As regards the practical consideration you refer me to on p. 443, I do not see how this affects the question. The point is that, as soon as any real stress arose, co-partnership broke down under the test, owing to its being based on an insecure foundation. As expressed by the gas companies, co-partnership is only a fair-weather ship, and requires modification by them if they wish to benefit from it by an earnest, interested, and continued effort for the common good on the part of the workers.

The days of cheap, or even moderate priced, coal are gone—not to return, I fear, in our time. Oil is dear, and more likely to rise in price than fall. And wages tend ever upwards. The workers know this; and knowing it, they would be more than human if they continued to put forth their best efforts without hope of further reward.

I am not an opponent of co-partnership. On the contrary, I strongly believe in it, but not as worked by the gas companies.

I have endeavoured to point out its basic weakness, and it is now up to them to profit by my friendly criticism.

EDGAR O. GUTTRIDGE.

24, *Sandmere Road, Brixton, S.W.*,
June 3, 1915.

[The correspondence of which the above is the latest phase is referred to in the current month's number of the "South Metropolitan Gas Company's Co-Partnership Journal," some extracts from which appear on p. 503.—ED. J.G L.]

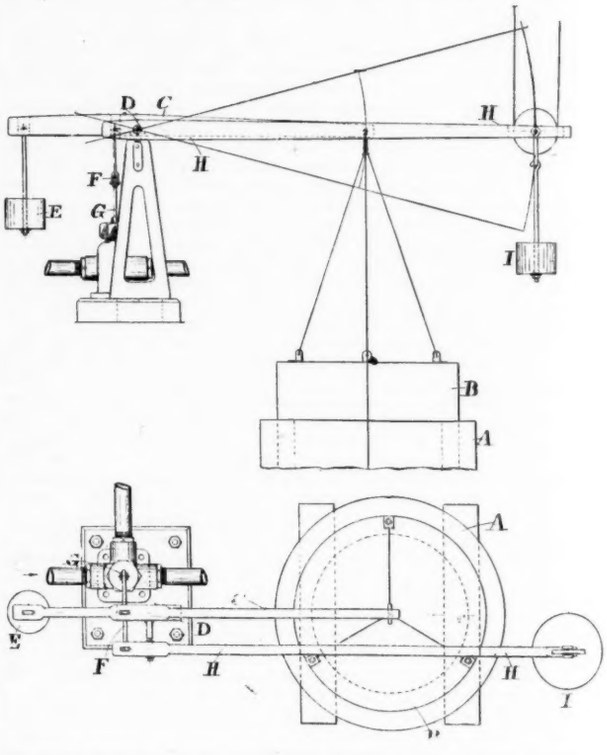
REGISTER OF PATENTS.

Pressure-Regulation Valves.

IONIDES, P. D., of Glasgow, and the POWER GAS ECONOMY, LIMITED, of Twickenham.

No. 8709; April 6, 1914.

This invention relates to pressure-regulating apparatus especially applicable for controlling valves with a view to ensuring a constant pressure in gas-mains, &c. The arrangement of the mechanism is such that the points of connection of the operating lever with the lever mechanism serve alternatively as the fulcrum of the operating lever, according to which lever mechanism is operative. The pressure is also caused to operate upon the mechanism through a gas-bell.



Ionides' (Power Gas Economy Company) Pressure-Regulation Valves.

A pressure regulating apparatus according to the invention is illustrated in elevation and plan.

The valve may be opened and closed by means of a hydraulic cylinder operated by oil under pressure—the hydraulic cylinder being mounted upon the valve casing, while the valve is directly connected to the piston in the cylinder by means of a piston-rod passing through stuffing glands provided on the hydraulic cylinder and on the valve casing. Thus on the admission of oil under pressure beneath the piston in the cylinder, the valve is lifted; whereas on the oil being admitted above the piston the valve is closed—the movement in one direction or the other being determined according to the corresponding movement imparted to the control valve.

There is provided a casing A for a gasholder bell B with a liquid seal, and communication is established between the bell and the passage where the pressure is to be controlled. The bell is suspended from one end of a lever C pivoted upon a knife-edge D; and at the opposite end of the lever is a counterweight E. The bell is so loaded that, at the pressure it is desired to maintain, it is exactly balanced by the counterweight. Should the pressure increase, the bell will rise so that the opposite end of the lever falls. One end of the lever is connected in a central position to the operating lever F of a control valve. The operating lever at one extremity is connected to the rod G of the oil-control valve; while the other is connected to the end of a second lever H. On the depression of the lever F the control valve admits oil to the hydraulic cylinder, so that the piston will be forced downwards

and the valve in the passage closed. The end of the piston-rod of the oil-cylinder is connected to the end of the lever H, which is mounted parallel with the lever C, and adjacent thereto, so that it may be connected near the end of its smaller arm to the lever F.

The lever H has a weight I suspended near the outermost extremity of its longer arm; while at the same extremity connection is made by means of a cord or chain passing around pulleys, with the outer protruding end of the piston-rod of the oil-cylinder. The cord or chain is at one end secured to a hook or bracket, and then passes round a pulley connected near the extremity of the longer arm of the lever H, and over guide pulleys to the end of the piston-rod. Thus the movement of the piston-rod on the closure of the valve will effect a depression of the end of the lever F, whereby the latter will be moved around its central point as a fulcrum, and the valve rod G be lifted so that the control valve returns to a neutral position. This operation is continued until the predetermined pressure in the main is obtained.

Should the pressure decrease, the bell B will descend, and therefore the lever F will be uplifted, whereby oil will be admitted to the oil-cylinder so as to cause the opening of the valve. In so doing the lever H will fall, whereby the control valve will be brought into its neutral position.

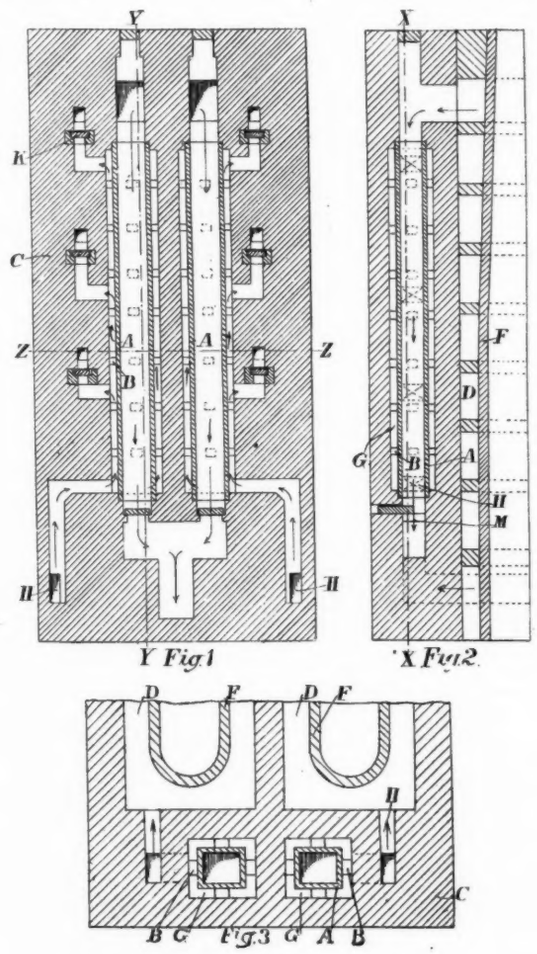
By such means (the inventor remarks) an apparatus is provided which, while it is extremely sensitive, does not hunt; while, furthermore, one source of power is available for the operation of a number of separate sets of gears. Moreover, the apparatus is capable of responding to sudden changes in pressure in the mains; while at the same time it is responsive to slow and gradual changes.

Vertical Retorts.

DRAKES LIMITED and DRAKE, W. A., of Ovenden, Halifax.

No. 8740; April 7, 1914.

This invention relates to the regenerative flues used in connection with vertical retorts. It consists in "the combination of regenerative flues produced by tubes being built into the walls of the combustion chambers within which the retorts are situated, and means for permitting the admission of heated air at varied levels to the combustion chambers, each element of which combination taken separately is already well known but by which combination more desirable results are obtained."



Drake's Regenerative Flues for Vertical Retorts.

Fig. 1 is a vertical section on the line X—X of fig. 2 of a structure within which two retorts are situated. It illustrates one arrangement of their secondary air-flues in conjunction with the flues for the escape of the waste gases. Fig. 2 is a vertical section on the line Y—Y of fig. 1. Fig. 3 is a sectional plan on the line Z—Z of fig. 1.

In this arrangement of recuperative flues use is made of tubes A and supporting or surrounding brickwork at the joints of the tubes at B, so that the flues extend vertically through the walls C adjoining the several combustion chambers D in which the retorts F are set. According to another system, the tubes A are arranged horizontally, and the end connecting flues are of ordinary brickwork.

The position of the tubes A relatively to the flues G for the secondary air surrounding them is such that the secondary air, on entering the opening H, passes from the lower part, where it enters the opening in the direction of the arrows, in order that it may finally ascend to the top outlet opening from the secondary-air passages, through which it escapes into the combustion chamber D past the damper K. Or, provided it is desired that the secondary air should enter any of the lower combustion chambers D, it may be allowed to escape from the flues, past dampers situated in any lower position, in order that the secondary air may be used to support combustion in one or more of the several chambers D which surround the retorts. The flues thus arranged are always open at their lower extremities for the ingress of fresh or secondary air, the controlling of the flow of which is only effected at the egress by the dampers.

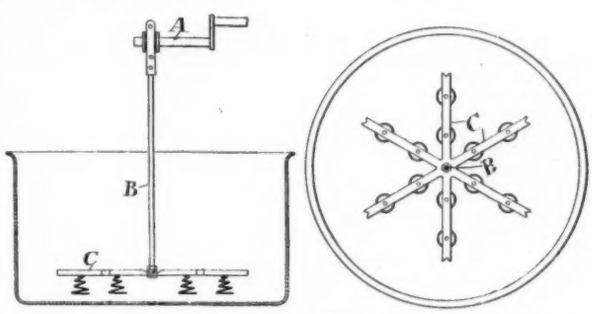
The tubes A and flues G are in such positions in the walls of the structure C that they are easy of access through the walls in order to facilitate cleaning operations, or the removal of any deposited substances, or permit the carrying out of any repairs.

Controlling the Supply of Gas to Burners.

GRUNDY, R. R., of Brunswick, Victoria.

No. 11,759; May 13, 1914.

This invention relates to distance gas-lighters, in several known types of which one or more diaphragms are caused to move under gas pressure from the mains. The present apparatus is of the type in which two spring-controlled diaphragms are mounted to move under varying pressure in the gas-mains, and as they move to operate (by pawl and ratchet mechanism) the cock or valve which controls the flow of gas to the burner. In one such known device two diaphragms are employed, of which one, moving under a given decrease of pressure, turns the gas-cock by its ratchet mechanism so as to admit gas to the burner, while the other diaphragm, moving under a still further decrease in pressure, turns the cock further round, and cuts off the gas to the burner. But in this apparatus no provision is made for turning the pilot light on and off.



Grundy's Distance Gas-Lamp Lighter.

According to the present invention, however, one of the two diaphragms is, on a given rise of pressure, made to admit gas to the lamp and cut off the gas from the pilot (and so light the lamp and extinguish the pilot), and the other diaphragm, on the pressure being reduced below normal, and then increased, is caused to cut off the gas from the lamp and admit it to the pilot (and so extinguish the lamp and light the pilot).

In another form of apparatus for the same purpose, but employing no pawl and ratchet mechanism, one of two diaphragms, on the gas being raised from low pressure to working pressure, rises, admitting gas to the lamp, and cutting off the pilot by means of a valve lifted with the diaphragm, while on the pressure rising further, the other diaphragm lifts, and, admitting gas to the back of the first diaphragm, causes it to fall under a weight or spring pressure—thus cutting off the lamp and presumably lighting the pilot. On the pressure being reduced below working pressure the second diaphragm also drops.

The invention also includes novel means of exercising and adjusting pressure on the diaphragms in apparatus of this class, so as to counteract the gas pressure.

Further, the apparatus (like other known devices) can be arranged to light groups or sections of groups of lamps, and can also be adapted to extinguish groups or sections of groups at different times. Special means are provided for operating the mechanism by gas pressure against each diaphragm for actuating the gas-valves; also for operating them by hand and for locking the apparatus when not required for use by gas pressure.

A construction in which two diaphragms are employed is shown in front elevation (opposite sides are similar); in side elevation with a hand operating lever attached complete, ready to be fixed to a lamp; also, longitudinal and transverse sectional elevations.

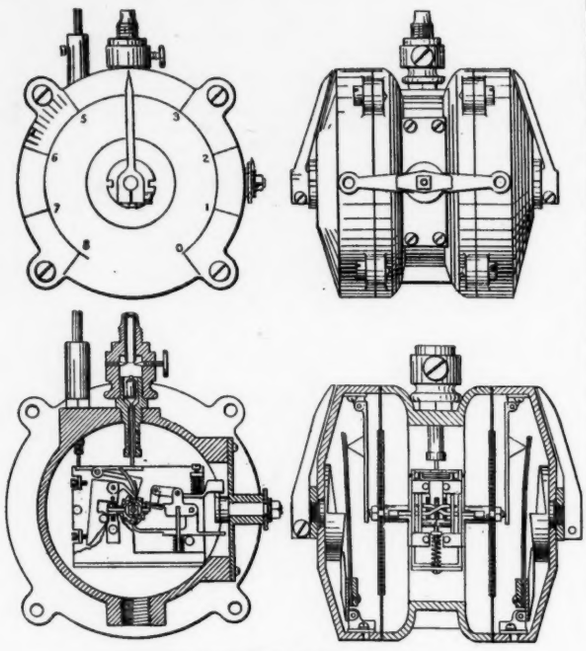
Agitating Devices for Promoting Solution of Solids in Liquids.

SHEWRING, F., of Droitwich.

No. 11,777; May 13, 1914.

These mechanically operated agitating devices are intended for promoting and maintaining the suspension of solids in liquids—such as calcium oxide mixed with water to form milk of lime to be fed to a sulphate of ammonia still, and so overcome the difficulties experienced

in maintaining a constant specific gravity owing to the tendency of the solid matter to settle-out in the bottom of the mixing-tank, and the different depths of the settled solids which need to be displaced by the agitating devices.



Shewring's Milk of Lime Agitator.

An illustration is given of the mixing-tank, agitator, and part of mechanical means for the continuous operation of the latter; also a sectional plan with the mechanical means cut away.

A is a crank-pin connected to a vertical rod B of the agitator, and revolved from a crank with either a simple revolving crank movement or a compound movement revolving about its own centre and also about an additional axis which is eccentric to the crank-pin axis—the idea being to impart to the vertical rod Y an up-and-down and also a sideways swinging movement.

The vertical rod is rigidly connected at its lower end to a base-piece C, formed of a number of rigidly connected radiating arms to the undersides of which are secured coil springs or other resilient devices. These enable the base-piece to be set quite close to the bottom of the tank; and in the operation of the agitator they have a beating and scraping action on any settled solids and also compensate (from the constant mechanical movements of the agitator) for different depths of settled solids in the bottom of the tank.

In operation the springs secured to the bottom of the base-piece are "most efficient in disturbing any settled solids and in preventing any undue strain on the mechanical devices by reason of different depths of solids having settled, and they enable the full depth of the tank to be reached with always a smooth and soft working of the agitator."

Dry Gas-Meter Diaphragms.

HANSFORD, J., of New Barnet.

No. 12,790; May 25, 1914.

This invention relates to the fixing of the leather diaphragms of gas-meters by constructing the rims forming the measuring chamber attached to the division plate with grooves on the exterior or interior of suitable size and shape to allow the leather to lie conveniently on the bottom of such recess. A wire is shaped to fit the groove; the ends of the wire being formed to allow a wedge or distance-piece being placed between them. Then a keep-piece of tin of suitable thickness and shaped to suit the groove with an extension piece forms the folding and fixing tab.

APPLICATIONS FOR LETTERS PATENT.

7769.—WELLINGTON, S. N., "Distilling coal." May 25.
7788.—THORP, F. & H. T., "Slot-meters." May 26.
7902.—HARSANT, H., and JEFFERY, A., "Gas-compressor." May 28.
7920.—M'COURT, C. D., and COMMERCIAL LABORATORIES, LIMITED, "Combustion of gaseous or vaporous fuels." May 28.
7966.—YATES, H. J., and BRAYSHAW, S. N. & E. R., "Furnaces." May 29.
8003.—GÜTTNER, M., "Gas-compressors." May 29.

Darwen Tradesmen and the Value of Good Lighting.—A brief reference to the value of efficient shop and street lighting was made last week at the annual meeting of the Darwen Tradesmen's Association, when Mr. A. P. Dalton (the President) said that the saving in gas charges owing to the restriction of lighting did not compensate them for the loss of trade. Another speaker dealt with the question of municipal trading, and urged that the ratepayers' money should not be used to compete with ratepayers; but the principle did not apply to such commodities as gas and water.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bills committed: Ammanford District Council (Unopposed), Skegness Gas.

Bills to confirm Provisional Orders under the Private Legislation Procedure (Scotland) Act, 1899, relating to Irvine Water and Kilmarnock Gas were presented last Thursday, and read the first time.

HOUSE OF COMMONS.

The following further progress has been made with Bills:—

Bills committed: Gas and Water Provisional Orders (No. 1) relating to Oakham Gas, Staveley Gas, Thirsk Gas, Thirsk District Water. Gas and Water Provisional Orders (No. 2), relating to Guildford, Melton Mowbray, Swanage, Hoylake and West Kirby. Gas and Water Provisional Orders (No. 3), relating to Cheadle, Heathfield and Waldron, Liverpool, Mid Kent, Rothwell, Fisherton Anger and Bemerton.

Lords Bills read a second time and committed: South Staffordshire Water, Spennymoor and Tudhoe Gas, West Gloucestershire Water.

Lords Bill read the third time and passed, without amendment: Frimley and Farnborough District Water.

Bill read the third time and passed: Forfar Gas.

The Gas and Water Provisional Orders (No. 1) Bill has been referred to a Select Committee, consisting of the Chairman of Ways and Means, the Deputy-Chairman, Mr. Mooney, and Mr. George Roberts; to meet next Thursday.

Petitions have been deposited against the following:

Ashington District Council Bill [Lords] by the North-Eastern Railway Company and the Duke of Northumberland.

Southampton (Extension) Order by the Southampton Gas Company.

Street and District Electric Lighting Order by the Somerton Gas Company.

South Staffordshire Water Bill [Lords] by the Dudley Corporation and others and the Wolverhampton Corporation.

The petition of the Epsom Rural District Council against the Sutton District Water Bill [Lords] has been withdrawn.

The consideration of the Ashington District Council Bill is appointed for to-day.

MISCELLANEOUS NEWS.

BIRMINGHAM GAS UNDERTAKING.

Annual Report before the Council.

Last Tuesday the Birmingham City Council met for the special purpose of receiving the reports of the trading departments of the Corporation for the past financial year. The LORD MAYOR (Alderman Bowater) presided; and after the transaction of some formal business, the report of the Gas Committee—the main features of which were given on p. 520 of last week's issue—was submitted.

Alderman Sir HALLEWELL ROGERS presented the report and proposed: "That the price of gas be increased by 3d. per 1000 cubic feet, to take effect from the June reading of the meters, and that the quantity of gas supplied through prepayment meters be reduced as under from the same time—with gas-fittings and cookers free, from 35 to 31 cubic feet per penny; and with cookers only free, from 39 to 35 cubic feet per penny." He reminded the Council that in March, when the scale of charges was adjusted on a more equitable basis, he mentioned that if only a moderate increase in the price of coal took place he trusted it would not be necessary to ask the Council again to revise the gas prices. The coal market, however, had become an increasingly difficult one; and the Committee had to face a large advance in the price of coal, and also in the price of gas oil. In addition, there were the advances of wages to the men, representing about £15,000 per annum, and the continued decline in the price of tar, which was one of their principal residuals. Further burdens had to be borne by the department through the doubling of the income-tax and the increased assessment of the undertaking for local rates. The Committee anticipated that the advance in the price of gas now proposed, together with the effect of the revision in March last, would be sufficient to cover the increased charges. It had always been the policy of the department, when the cost of coal had been increased, to advance the prices of gas as little as possible; and the increase now proposed would not allow of any substantial increase in the sum they proposed to hand over to the relief of the rates this year. The Committee hoped the present rise in the price of gas would only be a temporary measure, and that when normal conditions again prevailed they would be able to reduce the prices. Owing to the increased cost of coal and other extra charges, practically every gas undertaking in the kingdom had been compelled to raise the price of gas, many of them as much as 6d. per 1000 cubic feet, and one large company by 8d. The Committee felt that unless some unforeseen difficulties arose, the 3d. increase now recommended would meet the extra charges. No alteration was made in March in the quantity supplied through the automatic meters; and he did not, therefore, think the small alteration now made would hurt these consumers.

Mr. SHANN moved as an amendment that 2d. be substituted for 3d. as the proposed increase per 1000 cubic feet in the price of gas. He

was not convinced, he said, by the report or the Chairman's speech that it was necessary to increase the price by 3d. He agreed that in a business enterprise there should be a margin of profit, and under the circumstances a profit of something like £30,000 might be legitimate. But he felt that the Committee had been influenced by the desire to increase the profits in the interests of relieving the rates, rather than by consideration for the affairs of the undertaking. It was not, in his opinion, a good business policy to use the trading concerns as a means of indirect taxation at any time; and in the present instance it should be remembered that those who paid for the gas included thousands of working people and small tradesmen who were hit very hard just now. A system of indirect taxation which made people pay income-tax which they ought not to pay was not businesslike; and he was afraid the Finance Committee were behind the Gas Committee in the proposal now brought forward.

Mr. FRYER seconded the amendment, because he thought it aimed at a sound principle—that large municipal undertakings should be rega ded as concerns whose chief duty should be service and not profit-making. It seemed to him that the proposed increase was more than could be justified by the finances of the Gas Department.

Alderman BROOKS said the issue raised was whether the trading departments should be regarded merely as a means of providing public services without profit to the Corporation, or whether they should be conducted on commercial lines, and be expected to yield a fair return on the capital invested in them. The principle hitherto adopted had been that the undertakings should pay a fair return; and in his opinion the surplus profit transferred to the rates by the Gas Department of about £35,000 was not a very large return on a capital of two millions, and was small in comparison with the amount allocated to the rates in past years. Sir Hallewell Rogers had told them of increased charges which would have to be borne by the department during the coming year, and the reasons which induced the Committee to bring forward the present proposal. If the price of gas was raised in the manner suggested, the result was not likely to produce much more than the £35,000 which was now allocated; and therefore a case had been made out for the increase.

Alderman Sir HALLEWELL ROGERS, in reply, said the Gas Department had been pressed by the Finance Committee at various times to give larger sums to the rates, but not in the present instance. The Gas Committee felt that 3d. was the lowest amount they could suggest now. This year it was only proposed to hand over £25,000 from the legitimate profits of the gas undertaking, and £12,000 was taken from the reserve fund. If they accepted Mr. Shann's proposition, instead of making a profit of £25,000, there would be a loss of something like £15,000. He did not think the Council would agree to this.

The resolution was carried by a very large majority; only seven members voting for the amendment.

Alderman Sir HALLEWELL ROGERS then moved the adoption of the report. He said the output of gas indicated the prosperous condition of trade in the city. This output was still being maintained at a considerably higher figure than at the corresponding period of last year, notwithstanding the reduction in public lighting. The increase in the cost of coal, oil, &c., was due to the higher price paid for oil, and to the fact that they had carbonized something like 26,000 or 27,000 tons of coal more. The rates and taxes showed an increase, and they would be higher during the ensuing year owing to the high income-tax rate and to the increased assessment of the department for local taxation. The war charges, which comprised the cost of the allowances to employees on active service, had amounted to £13,709. But £12,000 had been taken from reserve; so that the net charge to the department was about £1700. It was very satisfactory to see that the sales of gas had increased by £20,000; but against this there was a decrease in the receipts from residual products of a similar sum. This decrease was more serious than it appeared to be, because there should have been an increase, considering that they had carbonized so many thousand tons of coal more than previously. The balance of £169,000 carried to profit and loss account was the gross profit of the department; and the only other item which called for present comment was the interest charged by the bank, £9621, as against the interest allowed by the bank last year of £1653. This charge had been brought about by the replacements at the works, and by the necessity for holding very much larger stocks of coal, oil, and other materials, due to the present troublous times. Until normal conditions were again restored, there was little prospect of the charge decreasing.

Mr. RATCLIFF asked if the Chairman could hold out any hope of better facilities for the delivery of coke. At present there was considerable difficulty in obtaining supplies.

Alderman Sir HALLEWELL ROGERS said the Committee had experienced a good deal of difficulty in regard to the supply of coke. They had not been able to get the requisite number of men, horses, and carts. They had tried motors; but the whole problem had been a difficult one.

The report was agreed to.

GAS PROFITS IN AID OF THE RATES.

Piquant Discussion at Stockport.

At a meeting of the Stockport Town Council last Wednesday, Mr. J. WINTER, the Chairman of the Gas Committee, in moving the adoption of the minutes of the Gas Committee, said that at a previous meeting he had reported that it was "necessary for the Borough Treasurer to be informed of the sum which the Gas Committee would be prepared to hand over out of the profits of the undertaking during the past year in aid of the rates for the current year. The Borough Treasurer attended, and reported upon the accounts for the year ended March 31 last. It was resolved that the Gas Committee be recommended to contribute the sum of £8000 in aid of the rates for the current year. The Sub-Committee had before them particulars regarding the cost of coal, &c., furnished by the Gas Engineer; and, upon consideration, it was resolved that a minimum of 30,000 tons of coal be purchased for the current year. Resolved, that the discount of 1½d. in the shilling allowed to automatic meter consumers be discontinued, and that the price of gas to all other consumers be increased 6d. per 1000 cubic feet."

Mr. WINTER stated that, owing to decreased yield from residual products, the increase in the price of coal, the higher wages paid, and the decrease in the consumption of gas, the amount which it was proposed to give in aid of the rates was less than the previous year. With regard to increasing the charges for gas, they were only acting in conformity with the practice of other municipalities. It was, however, necessary that the price should be increased. After referring to the recent conferences held in London and Manchester regarding coal prices, coal deliveries, and the non-exportation of coal, he (Mr. Winter) said that the combined action of the gas undertakings of the country with the Board of Trade had had some effect; and at an early date they were determined to see whether something further could not be done to bring down the price of coal. He asked the Council to pass the Committee's minutes as they stood, so that the undertaking could be on a firm basis at the end of the financial year.

Mr. WELSH moved an amendment, that the minutes be referred back in so far as they related to the increased price of gas. From what he had learned, the undertaking had not made the £8000 profit which the Committee proposed to hand over in relief of the rates. The increased price of gas meant more money out of the gas consumer, who was going to be double-rated and so relieve other ratepayers.

Mr. HOLLIS, in seconding the amendment, said he had always contended that the price of gas should be kept as low as possible, and especially to the working classes.

Alderman BREWSTER said the gas consumer seemed to be looked upon as a simple, old-fashioned kind of person, who, so long as he was not "done" too much, would stand anything. By contrast, however, it appeared to him (Alderman Brewster) that the electrical consumer was more up-to-date, and noticed the smallest fraction charged on his account. The Chairman of the Gas Committee had justified the increase by the statement (which all of them knew to be true) that it was in accordance with what was being done in other towns.

Alderman FERNLEY, who for ten years was Chairman of the Gas Committee, said that the ratepayers had £500,000 invested in the gas undertaking; and the profit during the past year had been nearly £8000. Would any business man say this sum was an adequate return for the amount of money at stake? It would be very unjust indeed to the ratepayers if they were to allow the profit from the gas undertaking to be reduced, and the undertaking become (as it had nearly become this year) a charge upon them. A sum of £8000 was nothing as a return for the enormous amount of money invested.

Alderman SHARPLES said he remembered that some years ago a former Chairman of the Finance Committee declared that the gas undertaking had not yielded its fair share of profits in aid of the rates until it had yielded 1s. in the pound. He (the speaker) had always taken this as a criterion. He was as convinced now, as was Alderman Lees then, that the opinion expressed was correct. If the gas undertaking had yielded 1s. in the pound this year, the ratepayers would have been entitled to have received £25,000. In lieu of this, they would receive about £8000, with the prospect of a worse year in front of them. Suppose the undertaking ceased to make a profit? Who took the risk? The ratepayers. If the works became obsolete next year or the year after, the ratepayers had to bear the loss. They, therefore, had the right to expect a fair return on their money; and he thought that 1½ per cent. was not a fair return. The ratepayers of Stockport, having financed the undertaking, were, he thought, entitled to make at least 5 per cent. on the capital invested. Every undertaking ought to yield a minimum of 5 per cent. Owing to the fluctuating markets for residuals, and increasing coal prices, there was the risk of a deficit next year; and it might be necessary to levy a special rate to make it up. The price of coal to-day justified the Committee in the conclusion they had come to, and he thought they were entitled to the thanks of the Council for the work they were doing.

Replying to Mr. Royle, Mr. WINTER said the 6d. increase would produce about £30,000; but £10,000 of this sum would go for the increased coal prices alone.

The amendment was then put and lost by a large majority; the minutes being eventually agreed to.

PRICE OF GAS AT LEICESTER.

Although an attempt was made at a meeting of the Leicester Town Council last Tuesday evening to modify the Gas Committee's recommendation, by limiting the increase in the price of gas to 3d. per 1000 cubic feet, instead of making it 4d. as proposed, Alderman Smith carried the Council with him in the view that the present time is not one for experimenting in the matter.

It was pointed out by Mr. Hilton, in moving the adoption of the report, that fifty gas undertakings in various parts of the country had raised the prices which they charged. As was stated in the report, it was impossible to obtain a dependable forecast, for to estimate income and expenditure was unusually difficult. A most careful investigation had, however, been made as to the financial bearing of the whole matter. The estimate which had been arrived at was that £12,000 would be required to balance accounts, and to this sum must be added the amount required for a war bonus—about £1500. Alterations of prepayment meters would entail an expenditure of £300, bringing the total required to about £14,000. It was computed that the proposed increase of 4d. would bring in £17,000, which would leave £3000 for contingencies. This was a necessary margin in view of a probable decrease of consumption by reason of the higher price and the present enhanced cost of commodities generally. As to the prepayment meters, slight alterations in the mechanism would be rendered necessary. At present by means of these meters 30 cubic feet of gas were supplied for 1d., or 2s. 9d. per 1000 cubic feet, with a 2d. rebate. The new rate of supply would be 26 cubic feet, or 3s. 2d. per 1000 cubic feet, with a 3d. rebate—making the price 2s. 11d. instead of 2s. 7d.

SALFORD TOWN COUNCIL AND COAL PRICES.

Alderman Phillips, J.P., on the Situation.

At the Monthly Meeting of the Salford Town Council last Wednesday, Alderman F. S. Phillips, J.P., the Chairman of the Gas Committee, was asked to state the amount of increase in the price of coal per ton as compared with the previous year; and whether any steps had been taken to induce the Government to put a stop to the exploitation of the present time of stress by the coalowners. The speaker pointed out that during the last few months the price of gas had been twice increased by 3d. and 6d. per 1000 cubic feet, or 9d. altogether.

Replying, Alderman Phillips said it was not usual to give figures in the Council Chamber, but they were paying more for coal by several shillings per ton. He would be pleased to give his questioner the figures privately if he desired them. The Gas Committee had done exceedingly well so far, as the increase in the price of gas was not more than was required to meet the increase in the price of coal. Referring to the question of Government action regarding coal prices, he went on to say that, in conjunction with other large municipal undertakings, they had been at work endeavouring to get the Government to deal with the question of coal prices in the interests of the community. The Board of Trade had appointed a Special Committee with reference to coal prices in London, and they reported, after examining expert witnesses, that, even upon a very high estimate, the cost of coal had not increased more than 1s. per ton. Nevertheless in Lancashire the official advance made by the coalowners was 5s. per ton, and in some circumstances more than this—as much as 6s. a ton. In Yorkshire the official advance was 6s. and higher; in Scotland, it was at the rate of 9s. and 10s. per ton; and in other parts of the country there were advances varying between the highest and lowest figures he had given. The Special Committee of the Board of Trade also reported that a great deal of coal was being exported to neutral countries; and they recommended that the exporting should be restricted, so that the coal should be retained for home use. The same Committee had also recommended that if the prices did not shortly come down to a reasonable level, the Government should be asked to step in and control them. He was a member of the deputation that lately waited on the Board of Trade and laid the case before them. Since then a War Trade Committee had been appointed. This Committee had also been seen, and had the facts laid before them. Representatives of gas and electricity undertakings were to shortly meet a number of members of Parliament in order that pressure on this question should be maintained. He was hopeful that they would be able to obtain very considerable benefit for every user of coal. The change in the Government was in a sense unfortunate for them, because the Secretary of the Board of Trade had been changed, and the new Secretary, of course, now came fresh to this question. The miners had received an advance in wages of 15½ per cent.; and he was afraid that this was going to be made an excuse by the coalowners for preferring further demands. What these demands would be he could not at present say. The gas and electricity undertakings of the country had joined in using all their power to improve the present situation. Gas was, of course, used very largely indeed in the production of the munitions of war, and not merely for home comfort. So great was the consumption of coal that every shilling increase in the price would draw from the gas and electricity undertakings no less a sum than a million pounds sterling.

Alderman Phillips was cordially congratulated by his colleagues at the close of the proceedings on his trenchant statement as to the situation, and his remarks were frequently interrupted by applause.

OLDHAM GAS COMMITTEE AND THE PRICE OF COAL.

Alderman WILDE (the Chairman of the Oldham Gas Department), speaking at the last meeting of the Town Council on a proposal to increase the price of gas 6d. per 1000 cubic feet, from the 25th inst., again referred to the charges for coal for gas-making purposes. He said the advance in the price of gas was principally caused through the prices asked for coal. During the last four years, the price of coal had risen by no less than 8s. per ton. This advance, to his mind, proved that they were in the hands of a very close combine. He did not think the advance was at all warranted by the increased cost of coal-getting. It was an object-lesson for those who were clamouring for advanced wages and for war bonuses. The advances generally came back on the heads of those who had to pay for coal, and many other things. The Government ought to try to remedy this. The price now demanded for gas coal was entirely unwarranted. The increased wages paid, less production and extra establishment expenses, did not justify anything like the advance asked for, of 6s. to 7s. per ton. Had not great economies been effected in the gas-works during the last seven or eight years, the price of gas would have had to go up according to the advance in the price of coal. They had tided-over the difficulty until the present year, but were now compelled to make an advance. He found, on looking over the coal contracts, that probably 6d. per 1000 cubic feet would not cover the extra cost for the coming year. Perhaps they might get more for residuals; and, therefore, the Committee might come out on the right side at the end of the year.

Mr. ARTHUR ANDREW (the General Manager) submitted a list of purchases of coal, and stated that the average cost was 5s. 11d. per ton over last year's prices. He added, however, that the coal bought this year was of one quality, whereas last year there was a lower quality purchased, as well as the usual quality. The former had not been deemed satisfactory.

Alderman WILDE remarked that last year they purchased at an average of 1s. 4½d. per ton cheaper than in the previous year. It seemed to be simply a case of exploiting the war. In 1911, the average price paid was 11s. 0½d. per ton, whereas present contracts were at the rate of 19s. It would be hard to convince him that an advance of 8s. per ton in four years was justified.

The increase in the price of gas was approved.

COVENTRY GAS PROFITS.

The Coventry City Council have received the annual report of the Gas Committee [referred to last week, p. 523], showing the results of the past year's trading. It produced a net profit of £4446, which, together with £638 brought forward from last year, left an available surplus of £5084. This the Committee recommended should be carried forward to next year's account.

In moving the adoption of the report, Mr. Quinney (the Chairman of the Committee) regretted they were unable to present a better report this year. The year, he said, opened with fairly good prospects for a successful period. Coal, the chief item concerned in gas manufacture, could then be reasonably expected to be bought at a lower figure, which later proved to be the case. The works were better equipped; and so satisfied were the Committee with the state of affairs that it was thought safe to reduce the price of gas to prepayment consumers by 2d. per 1000 cubic feet. Needless to say, circumstances arose which affected not only their undertaking but all gas undertakings more or less throughout the kingdom. The net profit this year compared with £12,276 last year. It was difficult to say how much the profit had been reduced directly owing to the war, but, at any rate, for the year of account it had not been very great. The items chiefly affected by the war were repair and maintenance of works and carbonizing wages. Repairs and maintenance of works last year cost £17,671, as against £16,835 in the previous year; but as less work was done this year, there should have been a fair reduction in cost. This came out more clearly in carbonizing wages, because, though less coal was carbonized and more gas made, the wages had amounted to £5587, compared with £4931 in the previous year. As regards coal, this had cost £5489 less than last year. About £2617 of this was due to decreased cost on contracts made last year, and the balance of £2872 to the smaller quantity of coal used. A larger amount of water gas was used in the account year, and therefore to make comparison with the previous year there must be included materials for making it, and the comparison then would be: Cost of carbonizing materials this year £72,184, compared with £75,478 the previous year, giving a reduced cost this year of £3294. The reduction in profit this year was almost entirely due to two causes—reduced value of residual products and loss of revenue owing to a reduction of 2d. per 1000 cubic feet to slot consumers. The reductions were: Receipts from residuals, £7097; due to decrease of 2d. per 1000 cubic feet, £3514—giving a total of £10,251. Taking from this the reduced cost of carbonizing materials, they had a net reduction of £6957. The difference between this figure and the reduced net profit was made up of smaller extra costs—principally, however, about £849 which was expended during the year on additional public lamps and the necessary service pipes for them for lighting courts in the city. Mention was also made of the fact that, whereas there was a reduction of twenty-four consumers through ordinary meters, slot consumers had increased by 1694. The total number of meters in use was 8420 ordinary and 19,410 slots, and 22,877 cookers were out on hire or loan. The actual amount collected in pennies from slot meters during the year was £51,045. Coming to the prospects for the ensuing year, Mr. Quinney remarked that the point could not be too strongly emphasized that the great advance in the price of coal would be severely felt in the next two or three years. The Committee had made contracts for their coal supply for the current year (about 100,000 tons) at very enhanced prices; and this would be more than they would actually require. This represented an increase in the coal bill of £24,000; but as there was a large quantity of coal from last year's contracts undelivered, the present year would feel this only to the extent of about £14,500. The full effect of increased wages and cost of all materials, however, would have to be borne. This was estimated at approximately £4000—making a total increase of £14,500. From this had to be deducted the increased revenue from gas due to the extra 2d. per 1000 cubic feet in the price, which was estimated at £8000; the net result being a loss of £9700. The available balance this year was £5084; and if the Council adopted the Committee's recommendation to carry this sum forward, there would still be a deficit next year estimated at £4616. Reference was also made to the fact that in thirty years the gas undertaking had given £75,114 in relief of the rates; but it was contended that the reserve fund had not been built up sufficiently. Half the money should have been kept as a reserve; so that in a time of difficulty like the present they would be able to face the future with equanimity.

There was little discussion on the report, which was adopted.

WEST BROMWICH GAS UNDERTAKING.

At a Meeting of the West Bromwich Town Council last Wednesday, there was a long discussion with regard to the position of the gas undertaking.

Mr. J. BROCKHOUSE (the Chairman of the Committee) referred, with some regret, to the fact that the income for the year (£62,373) showed a decrease of £70. The gross profit, he said, amounted to £11,352; and after payment of interest and sinking fund charges, the net profit was £1307. They had spent during the year £806 on automatic lamp controllers, and £2759 the balance of the cost of the vertical retorts in excess of the loan sanctioned; and there had been a serious decrease of £2174 in the amount obtained for coke. He complimented the Borough Treasurer (Mr. H. Kirk) upon the admirable way in which he had prepared the accounts. Subsequently he moved that the prices of gas be increased to all consumers by 6d. per 1000 cubic feet; urging that this was inevitable, owing to the increased cost of coal, which made a difference of 5s. 9½d. per ton to the undertaking.

Mr. GILL thought it would be a graceful concession to the prepayment meter consumers, who were now paying 3s. 6d. per 1000 feet, if they were exempted from the increase.

Mr. BELL referred to the item of £2759 excess of expenditure in connection with the vertical retorts, and asked for a frank statement on

the position of the undertaking, which "would be only just and fair to the ratepayers." He also asked if the 6d. increase in price had anything to do with any loss in connection with the new vertical retorts. No reason had yet been given why the vertical retorts had cost nearly £3000 more than was estimated.

Mr. BROCKHOUSE said the Committee could not make the prepayment meter consumers exempt from the increase, owing to the heavy expense they were under for maintenance, repairs, and collection.

The BOROUGH TREASURER gave an explanation of the position in regard to the new vertical retorts. He pointed out that in 1913 the Gas Committee applied for sanction to erect three settings of vertical retorts, and sanction was granted for £11,500. A month or two later they decided to erect two more settings, and obtained further sanction for £3740—a total of £15,240. The estimated cost of the retorts was £17,740; and this was the amount for which they applied. But as there was some plant to be superseded, and the old horizontal retorts to be scrapped, and as there was a debt on these retorts of £2500, the sum sanctioned was reduced by this amount. That sum was provided from the profits of the concern; and this was the reason why £2759 was charged in the net revenue appropriated. In connection with the vertical retorts there had been some trouble; and the contractors did not complete the work as they should have done under their contract. Through labour and other troubles, the completion of the work was delayed for about seven months; and the Gas Committee claimed £800 as compensation from the contractors. They eventually agreed to accept £625 in settlement. The total estimated cost of the vertical retorts was £17,740; but they actually cost £17,999. So that the original estimate was exceeded by £259.

The explanation was considered satisfactory, and the accounts were approved.

Mr. Kirk, in his report for the year ended March 31, says that the total income for the twelve months on revenue account amounted to £62,373, as compared with £62,443 for the previous year, or a decrease of £70. The net income from sales of gas amounted to £41,464 12s. 9d., an increase of £2290. The total quantity of gas sold was 396,948,284 cubic feet, an increase of 29,843,522 cubic feet, equal to 8·12 per cent. The average price obtained for all gas sold was 2s. 1·99d. per 1000 cubic feet. The total number of consumers of all classes at the end of the financial year was 12,419, an increase of 105.

The amount derived from the sale of residuals was £16,900, as compared with £19,509 the previous year, a decrease of £2609. There was a decrease of £2174 from coke sales. The quantity sold was less than during the previous year; and the average price obtained shows a decrease of 1s. 2¼d. per ton. The total expenditure on revenue account amounted to £51,020, compared with £52,249, or a decrease of £1229. The net cost of manufacture, after deducting the income from residual products, was 1s. per 1000 cubic feet sold, as compared with 1s. 1d. the previous year.

Over 27 million cubic feet of gas were supplied during the year for public lighting purposes, at a charge of 1s. per 1000 cubic feet; but if this quantity of gas had been charged at the ordinary lighting rates, it would have produced an additional income of £1375. While no specific grant has been made in aid of rates, it is nevertheless true that the gas undertaking assisted the general district rate last year to the extent of £1587 in respect of the public lighting of the borough.

The gross profit for the year, carried to the net revenue account, was £11,352, compared with £10,193 the previous year, an increase of £1158. After various charges, there remains a net profit for the year amounting to £1307, compared with £1238 for the previous year. The net revenue appropriation account shows a balance of £18,776 brought forward from the previous year, which, with the profit for the year, makes a total of £20,184, against which is charged £806, the expenditure on automatic controllers for the public street-lamps, and £2759, the balance of expenditure on vertical retorts in excess of the amount sanctioned by the Local Government Board—leaving a balance of £16,618 to be carried forward.

CHESTERFIELD GAS UNDERTAKING.

In a report on the working of the Gas Department for the six months ended March 31, the Chesterfield Gas and Water Board state that the total quantity of gas sent out was 126,756,200 cubic feet, being an increase of 3,351,100 cubic feet over the corresponding period of last year, which equals 2·71 per cent. The total quantity of coal carbonized was 11,751 tons, giving a yield of 10,786 cubic feet per ton. The number of meters fixed on Sept. 30 was 12,121; and on March 31, 12,199. The Gas Committee point out that the make of gas is a record for the undertaking. They also call attention to the fact that, at the commencement of the Board's career, the make of gas was 9608 cubic feet per ton of coal; and this average was maintained for several years afterwards. Even in 1906 it was 9983 cubic feet per ton, against the past year, when it was 10,832 cubic feet—and this at a time when they were using entirely local or Derbyshire coal. Further, the price of gas for the year ended March, 1896, was 4s. per 1000 cubic feet and for the past year 2s. 8d. In 1906 the average price paid for coal was 7s. 6·1d. per ton; while during the year ended March, 1914, the price was 11s. 11·78d. per ton. The number of meters fixed and in use in 1896 was 1228, against 12,199 last March. The total revenue in the Gas Department for the year to March, 1897, was £12,852; for the year ended March 31, 1914, it was £38,240—an increase of £25,388, or 198 per cent. The purchase-money and cost of the Act for the gas-works was £116,853. In addition, £85,239 has been borrowed and spent on the works. Of the purchase-money, £36,470 has been repaid, and £46,506 of the money that has been borrowed for extensions and working capital. That is to say, while the purchase-money and money borrowed for extensions represent the sum of £202,092, the amount owing at the end of March, 1914, was only £119,115. The Committee compliment on their earnest work the chief officials of the Board—Mr. J. W. B. Simpson (the Commercial Manager), Mr. W. T. Buckland (the Resident Gas Engineer), and Mr. Charles Boldry—"who have materially assisted in bringing about these desirable results."

PRICE OF GAS IN THE TOTTENHAM DISTRICT.

In the "JOURNAL" a fortnight ago, there was published an account of a meeting of the Tottenham District Council, at which the General Purposes Committee reported that, as a result of the Council's opposition to the Tottenham and Edmonton Gas Bill of 1913, the Company gave an undertaking to the effect that the price of gas during the then ensuing three years should not exceed 2s. 1d. per 1000 cubic feet, and further that on Jan. 1, 1914, the price should be reduced to 2s. The latter part of the undertaking had been duly fulfilled, it was pointed out; and the price of gas still remained at 2s. per 1000. The officers of the Company had, however, interviewed the Clerk of the Council and the Engineer, and had requested the Council to release the Company from the undertaking, in view of the unanticipated increase in the cost of coals and of the extra expenses which the Company are committed to in consequence of the war. They recommended that the Company should be informed that the Council would not consent, and this was agreed to.

The "Tottenham and Edmonton Herald," in a leading article, made some strong comments on the unfair attitude adopted by the Council towards the Company; and this they have since followed up by another article, in the course of which they say: We have listened to a number of comments which have led us to make further inquiries. The result of these is to emphasize, if it were needed, the reasonableness of the Company's case and the inequitable attitude that the Council was led to take. The Company's price to private consumers is 2s. per 1000 cubic feet, against other Metropolitan Companies' prices ranging from 2s. 8d. to 3s.—representing rises of 4d. to 8d. per 1000 feet. Whether this information was put before the Committee of the Council, which is generally reported to have "carefully considered" the subject-matter before it, we are, of course, not in a position to say; but certainly its recommendation, on which the Council acted, would not appear to indicate that it considered any information of the sort, which we are now able to supply over and above that above quoted. It looks as though the only argument presented to the Committee was that the Gas Company had entered into a certain agreement as to the maximum price to be charged to the Council at a time when many people thought the idea of a war with Germany—and much less with Austria—was too remote or too ridiculous to be entertained. Now all national and industrial conditions have been fiercely disturbed from one end of the world to the other; and this has been recognized by all classes of men in responsible positions on public authorities. The additional facts we have ascertained—and we admit they are official—are that the average price of coals delivered at the Gas Company's works from July, 1913, to June, 1914, was 18s. 8d. per ton. That was about the time when the Company's contract with the Council was made. The average price of the coals delivered at the works (as contracted for) between July, 1915, and June, 1916, shows an advance of 4s. 2d. a ton on the above price; and, as a matter of fact, the Company is now paying—because of the war—5s. 8d. a ton more than when its bargain was made with the Council. Surely this condition of things could not have been laid before the Committee of the Council. We should also add, to the Company's credit, that it has paid no less than £3900 to dependants of employees enlisted in His Majesty's Forces, and £4400 as war bonus on wages to help to meet the increased cost of living, as well as suffered a loss of £3100 on the rental of private lamps extinguished by order of the police authorities, and also a sum of several hundreds by reason of the partial extinguishment of public lighting. This totals up to a loss of some £12,000.

MAIDSTONE PUBLIC LIGHTING.

Gas and Electrical Interests.

There was some discussion at the monthly meeting of the Maidstone Town Council on the question of public lighting, which arose on a report by the Electricity Committee to the effect that the matter of the terms of a new agreement with the Gas Company for street lighting, referred to them by the Highways Committee, had been carefully considered. They recommended: (1) That the proposed three years' agreement be not entered into. (2) That the Council go on without an agreement for the present, paying 30s. per lamp per annum for the upkeep, lighting, and extinguishing the lamps, as proposed to be charged by the Company. (3) That until further notice a certain number of street-lamps be discontinued as from June 1. A list of such lamps will be provided by the Borough Surveyor.

Alderman VAUGHAN, in moving the adoption of the report, said there had been a lot of correspondence with reference to the question of the agreement with the Gas Company. On Feb. 5, the Town Clerk received notice from the Company terminating their agreement with the Council on May 31; and this was placed before the Highways Committee. Eventually it was decided that a Sub-Committee, consisting of four members of the Highways Committee and four members of the Electricity Committee, should be appointed to go into the whole question, and if possible come to a decision upon it. The proposal put forward by the Gas Company the Sub-Committee were not prepared to accept; and he thought the Council would agree that their reasons were sufficient, if he read to them a letter from the Borough Surveyor as to the position. The Surveyor in this letter pointed out that the cost of maintenance and the lighting and extinguishing of the gas-lit lamps under the old agreement was £1 4s. per annum, while the amount under the new agreement would be £1 10s. The cost of gas would be £2 2s. 6d., as against £1 17s. 6d.—making the total cost per lamp £3 12s., as compared with £3 1s. 6d. The consumption of gas under the new agreement would be 17,000 cubic feet, as against 15,000 feet; the consumption per lamp per hour being increased from 4½ to 4¾ cubic feet. It was proposed to add 574 cubic feet, as the quantity of gas consumed by the bye-passes fitted to the lamps; and the Surveyor did not consider this reasonable, because the bye-passes were simply for convenience in lighting the lamps. For the extension of mains there was to be a new arrangement; but no clause was included

that the Gas Company should remove any gas-lamp that was not required. Finally, the Council were to pay for services, which, in the case of an ordinary consumer, the Company put in free of charge. The Sub-Committee, Alderman Vaughan remarked, could not recommend that the Council should be bound for three years by the proposed new agreement. They were willing to pay 30s. per lamp for the maintenance and lighting and extinguishing of the lamps, though the Electricity Committee were prepared to do the work at the old price of 24s.; and, of course, they would have to pay the extra cost of gas. If the Gas Company were not prepared to accept the offer recommended, he believed that under the Company's Act the question could be settled by arbitration; and the Sub-Committee would be quite willing to abide by the decision.

Alderman LAURENCE said he was very sorry this matter had come up on the report of the Electricity Committee, because it was obvious that the interests of that Committee must clash with the interests of the Gas Company. He considered that the Highways Committee should have dealt with the matter, and advised the Council as to what was the best course. He could not see how they could expect any business company to agree to the Sub-Committee's proposals.

Mr. WALLIS (the Chairman of the Highways Committee) remarked that this body did not consider the matter. They found the new agreement put forward by the Gas Company involved a 35 per cent. increase, and they thought it was only right that the Electricity Committee, who supplied a good many of the lights in the streets, should be consulted, with a view to seeing whether any saving to the town might be effected. The Sub-Committee appointed recommended that the Council should pay the Gas Company exactly what they asked for under the head of maintenance, together with the extra 3d. per 1000 cubic feet for gas consumed. But they did not consider they should bind themselves to 148 gas-lit lamps for three years. This was the crucial point of the whole matter. The Council had their own undertaking to think of; and it must be evident to all of them that the time was coming when the whole of the lighting of the town would be in their hands. But they did not want to deal harshly with the Gas Company. As the gas-lamps were reduced, the Company were entitled to extra money. It could not be expected that they should maintain fewer lights at the old scale of pay.

The MAYOR (Mr. W. H. Martin) observed that a letter had just been received from the Gas Company; and he thought this should be read to the Council.

The TOWN CLERK explained that, after the Sub-Committee had sent in their report, the Gas Company wrote and said the maintenance charge of 30s. was subject to the Council entering into the agreement to have 148 lamps; and that in the event of no such agreement being entered into, they would have to make a further charge. Thereupon he wrote and asked what the further charge would be; and in his reply, Mr. F. Livesey (the Manager to the Company) gave the following sliding scale: 140 lamps at £1 10s. per lamp; from 130 to 140, £1 12s. 6d.; from 120 to 130, £1 15s.; from 110 to 120, £1 17s. 6d.; from 100 to 110, £2; from 50 to 100, £2 5s. If the number of lamps fell under 50, Mr. Livesey added, the terms would have to be further revised. In the event of any new lamps being erected, the Council would be required to pay the full cost of the work.

It was agreed that the letter, together with the Electricity Committee's recommendation, should be referred to the Highways Committee.

A GOOD REPORT AT WORKINGTON.

Dearer Coal and Dearer Gas.

Matters connected with the gas undertaking occupied a considerable portion of the monthly meeting, held last Tuesday, of the Workington Town Council. In the first place, the Gas Committee recommended that, as the price of coal had been advanced by the Cumberland Coal Owners' Association by 4s. 9d. per ton, to 20s., which meant a loss to the department on 10,300 tons of £2446, the price for gas after the June indexing be as follows: Within the borough—Ordinary meters (except engines), 2s. 3d. per 1000 cubic feet (an advance of 3d.); ordinary meters (engines), 1s. 9d. (no advance); prepayment meters, 2s. 9d., or 30 feet for 1d. (an advance of 3d.); installations, 3s. (no advance). Outside the borough—Ordinary meters (excepting engines), 3s. 2d. per 1000 cubic feet; engines, 2s. 8d.; prepayment meters, 3s. 5d.

In moving the adoption of the report and accounts for the past year, Alderman Hall said that, notwithstanding the outbreak of the war in August last, the results obtained were the very best in the history of the works, and were due in a large measure to improved methods of working, stricter supervision, and more effective organization introduced by the Engineer and Manager (Mr. Horace Chamberlain) into the works practice. They carbonized 10,235 tons of coal, which was 116 tons less than the previous year, and yet made 4 million cubic feet more gas, without in any way deteriorating its value to the consumer; the yield of gas being 12,306 cubic feet per ton of coal, or 538 cubic feet per ton more than the make the previous year. Translated into concrete figures, this meant that they saved 447 tons 10 cwt. of coal, worth £351. Through all avenues of consumption—domestic, engines, cookers, and fires—there had been an advance. He would like to call the Council's attention to one item in the revenue account—the cost of purification. On the debtor side was an amount of £94 15s. 4d.; but they had received for spent oxide £51 7s. 9d., leaving the net cost of purifying 126 million cubic feet of gas at £43 7s. 7d.; whereas in 1910 it cost £424 2s. 4d. to purify less than 100 million cubic feet. This was very strong evidence of the need that existed of increased purification plant for the works, and the wisdom of the Committee in tackling and providing it when they did. As a matter of fact, they would have been dead beaten long ere this had they not done so. The actual gross profit as per balance-sheet was £86 more than last year; but taking the increased cost of coal £362, a full year's reduced price of gas against three-quarters last year £126, proportion of war wages £87, and other items, the gross profit for the year under review would have been £3386, or £940 more than the previous year. The Committee were satisfied with the results obtained, which constituted a record. In 1906 with coal at 11s. a ton and gas at 2s. 6d. per 1000 cubic feet, the gross profit was £3817. If these prices had been obtained last year, the profit would have been £7576. As to the future, everything they touched would cost them more; and as regarded coals, and he said it judicially, more than it ought. A charge of 19s. 3d. per ton on trucks at the pit was an unheard of price for Cumberland gas coal, and more than was warranted by present conditions. This had compelled them to recommend an increase in the price of gas for domestic purposes (other than prepayment installations) of 3d. per 1000 cubic feet, an unfortunate and retrograde step, but of necessity unavoidable. Looking forward, there were at any rate two things to be thankful for—had it not been for the fact that their new plant would certainly be available for the next winter load, the advance would have been double what was proposed; and there were a vast number of places where much greater advances were necessary. He did not think there was a town in Great Britain similar in size to Workington where the gas-works were doing so well for the consumers and the town.

The report and accounts were adopted.

ILKESTON GAS UNDERTAKING.

Faced by a probable increase of £3000 in their coal bill, the Gas Committee of the Ilkeston Corporation suggested, at the meeting of the Council, held last Tuesday, that the price charged for gas should be increased by 6d. per 1000 cubic feet, the Mayor (Councillor T. A. Macdonald), who moved the adoption of the report, pointing out that they were driven to take this action in common with gas concerns throughout the country. The times were entirely abnormal. When the Committee at first increased their coal bill estimate by £1000, they thought they might be somewhere near the mark; but he was sorry to say that £1000 represented only about a third of the probable increase in the cost of coal necessary for their gas production. The price of coal was going up enormously already. The Committee tried their best to make contracts a month or two since; but no colliery proprietors would enter into arrangements until the amount of the war bonus had been determined. It was quite possible that the price would go up by as much as 5s. per ton; and the Committee hoped, by now increasing the price charged for gas, to pay their way and so prevent the gas undertaking from becoming a charge upon the rates. The suggested increase would take effect from July 1.

Mr. W. SMITH opposed the proposed increase, which he thought would be most unjust, even under the special circumstances now obtaining. They had already gone two months of the financial year, and had sufficient coal to last another three months, which meant that for five months of the current year their coal would cost them 11s. 2d. per ton. For the past thirty years gas consumers had been charged a price which had permitted of large surpluses being applied in relief of the rates; and for this reason he urged they were now entitled to consideration. The proposed increase in the price of gas, enabling profits to be applied in relief of local burdens, would benefit most the larger ratepayers. The working classes would have to pay proportionately the greatest share, and this he characterized as a gross imposition. He admitted the price of coal had largely advanced; but they had already ear-marked £1000 to go towards meeting the extra cost for the year. In face of this, it had been estimated that the gas undertaking would show a profit for the year. He did not suggest that the gas concern should be permitted to become a charge upon the rates; but he did contend that during the present trying war period the price should not be increased. He moved that the recommendation should be deleted from the Committee's report.

Mr. E. SMITH seconded the amendment, arguing that the proposed increase was in the nature of a local war-tax, which circumstances did not warrant. At any rate, he suggested that no increase should be decided upon until it was proved that, at the current rates, gas could not be produced without actual loss.

Mr. A. HENSHAW supported the amendment, also contending that the increase would be a gross injustice to the working classes.

Alderman MOSS offered to support the amendment if Mr. Smith would agree that the increase should be as nearly as possible limited to 2d. per 1000 cubic feet; and to this Mr. Smith consented.

The MAYOR said that unless prices were increased a heavy loss would be entailed; but for the present he withdrew the Committee's recommendation, indicating that they would come to the Council again in reference to the matter.

The withdrawal of the Committee's recommendation was agreed to.

Projected Gas and Water Extensions at Kirkby.—At the last meeting of the Kirkby-in-Ashfield (Notts) District Council, it was reported that the Local Government Board had declined at present to sanction a proposed loan for water-works extension. It was decided, therefore, to drop the scheme for a time; but it was intimated that, in relation to the new gasholder which it is intended to erect, arrangements are to be at once made for raising the first instalment of the money required.

Blackpool Gas Prices Increased.—At a meeting of the Blackpool Town Council last Monday week it was unanimously decided to increase the price of gas by 6d. per 1000 cubic feet. Alderman Heap, the Chairman of the Finance Committee, said that in the coming year the Committee could not look forward to as good a yield from the revenue-earning departments as in the past. The Gas Department estimated their net profit for the ensuing year at only £2500. The price of gas had been increased by 6d. per 1000 cubic feet. There had been some complaint, and some difference of opinion with regard to the proposal, and it had been said that the rates should have been increased 6d. instead of the price of gas raised by this amount. The present was not the right time for going into a matter of this sort. They had discussed it over and over again, and so far as the policy of Blackpool was concerned it was their business to keep the rates as at present. Alderman Heap added that the charges for electricity were to be increased 10 per cent., and said the estimated net profit for that department was £5000. He described it as a growing concern.

PLACE OF THE GAS INDUSTRY IN THE COMMUNITY.

The Gas Light and Coke Company's "Co-Partners Magazine" for this month alludes to the part taken by Sir Corbet Woodall at the recent conference on the coal question of members of the gas and electrical industries.

It is remarked: The Governor, Sir Corbet Woodall, whose readiness to respond to a call for help and countenance in the furtherance of any worthy public service, is a pattern for us all to admire and to imitate so far as our powers and opportunities permit, took the chair at a recent remarkable meeting called for the purpose of considering the question of coal supply as it affects the gas and also the electrical industries—with a view to bring the matter under the attention of the Government. Sir Corbet gave the gathering, which was both representative and numerous, the benefit of his considered judgment of the coal situation as it confronts both these great and necessary public services. The point he was most careful to make and to press home, was the difference between the case of the gas and the electricity supplying undertakings and that of ordinary manufacturing concerns. The Governor made full use of the opportunity for explaining to the meanest capacity that the claim of the gas industry of the capital and other cities and centres of population and organized manufacturing enterprise to an adequate and uninterrupted provision of the raw material, coal, is superior to all mere commercial considerations.

Then, after giving a few extracts from the speech as it appeared in the columns of the "JOURNAL," the article concludes: This is a fine declaration of the importance of the place filled by gas in the community, now fighting for its liberty and life; and it is reproduced here in order that our co-partners and fellow-workers of every grade may be encouraged by the thought that we are also doing good and necessary service to our country. It will not be the fault of our Governor and his associates in the administration of our vast undertaking and the due fulfilment of its obligations, if the provision of all the necessary ways and means should fail by the smallest modicum. Nor is there the slightest reason for fearing that the working staff will fall short of their full duty. London with a poor or defective gas supply, or none at all, would be a calamity the very possibility of which from any cause without or within the gas companies' organization is unthinkable.

Price Raised at Carnarvon.—The Carnarvon Town Council have resolved, in accordance with an intimation made at the preceding meeting, to raise the price of gas 3d. per 1000 cubic feet, thus restoring it to what it was about twelve months ago. This, it was explained, was necessitated by an advance of about £900 in the contract price of coal for the next year. It was decided to grant the Corporation workmen a war bonus of 2s. a week.

CO-PARTNERSHIP IN TIMES OF ADVERSITY.

This month's issue of the "South Metropolitan Gas Company's Co-Partnership Journal"—alluding to some letters that have recently appeared in our "Correspondence" columns—contains the following.

As critics of the co-partnership principle are raising questions as to the effect of the reduction of bonus on the working of our scheme, it may be opportune to reprint some remarks of Sir George Livesey concerning the two bad years of 1892 and 1901. In a discussion at the meeting of the Southern District Association of Gas Engineers and Managers, on Nov. 14, 1907, a speaker suggested that it was not equitable to "penalize" the men because coal was dearer.

Sir George Livesey, replying to the discussion, said that to the effect of the rise in the price of coal he had often had this objection raised: "Why should the workmen suffer for, or benefit by, something for which they had not been in any way responsible?" The answer was: "Simply because they ought to suffer with the rest of their fellow-countrymen if a disaster or any misfortune came, and *vice versâ*. If the price of coal rose or fell, the consumers and the shareholders suffered or benefited, and why should not the workers?" It was of the essence of co-partnership that all should share and share alike. It had constantly been said that, under profit-sharing schemes, the profits were shared, but not the losses. Under their co-partnership system, they did share losses. In the South Metropolitan Company the bonus was reduced from 5 per cent. to 3 per cent. in the early nineties; and in 1900 it was reduced from 9 per cent. to *nil* for six months. The workmen were fully informed, and not a word of discontent was uttered. The bonus then went to 3¾ per cent. In the case of the South Suburban Gas Company, it came down from 6½ to 2 per cent. Now, how did the men take it? They took it as the shareholders did—with perfect equanimity. It was explained to them why it was; and they said they must take the rough with the smooth. The first time the bonus was reduced in the South Metropolitan Company, the Directors were a little bit anxious; but the men said: "We understand it. We see how it is; and we will try to get it back again." That was all. There had not been a word of complaint or objection raised in either Company when the bonus had been reduced. It had been reduced again in the case of both Companies with the rise in the price of gas last July; and the men were perfectly satisfied with the reason given—the rise in coal. Co-partnership should be made as real and intimate as possible; and any circumstances that affected the company should be shared by all alike—consumers, shareholders, and employees. This was the essence of the sliding-scale, and it satisfied all parties.

The "Co-Partnership Journal" also reproduces some editorial remarks made in one of our recent issues, when publishing a letter from a Mr. Edgar O. Guttridge, who had expressed the opinion that the co-partnership systems of the South Metropolitan Company and of the Gas Light and Coke Company "have totally failed." Our monthly

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contemporary remarks: So it appears to Mr. Guttridge, who speaks as "an employer of labour"—a rather indefinite qualification for giving opinions on the economics of industry, especially on points outside one's own experience. The letter denounces the Livesey scheme as essentially defective and doomed from its inception to failure, and seems to suggest that it was unfortunate that Sir George Livesey and his multitudinous followers were not "business men," in the Brixton sense. This is how Mr. Guttridge puts it:

> It was apparent to any business man that making the workers' share practically dependent upon the cost of raw material at the works was inherently bad, and bound to fail at such a time as the present, when raw material has risen to such a point that the share of the worker is almost entirely wiped-out. In such circumstances, raw material can always beat the worker; and no doubt he is aware of it. This is not co-partnership in its true spirit at all; and it is obvious that the ideal system has yet to be introduced—at any rate, into our two largest gas companies.

Let us face the facts. Co-partnership involves a share in the profits of the business; and it naturally follows that if the profits are small, the workers' share of them will be correspondingly small. Profits are dependent on several factors, one of which is the cost of raw material. If raw material is cheap, the workers get the advantage; and if it is so dear that it causes the shareholders' dividend to be reduced, it is quite fair that the workers should receive a smaller bonus. Owing to war conditions the cost of coal and transport have greatly increased; and the operation of the sliding-scale, which was devised to prevent a gas company from placing the whole of its losses on the consumers, works out as follows:

(*a*) The consumer is paying about 30 per cent. more for his gas.
(*b*) The shareholders' dividend has been reduced by nearly 20 per cent.
(*c*) Under the co-partnership scheme the workers will have to suffer to the extent of 6 per cent. on their wages; but, so far as the ordinary wage-earning employee is concerned, this has practically been made up to him by a "war bonus" on his wages.

Mr. Guttridge says that this "is not co-partnership in its true spirit at all." We do not know what he means by co-partnership; but we suggest that the workers, at any rate, have no grounds for complaint. If the "ideal system" is one which will share profits when there are none, we should like Mr. Guttridge to try it in his own business for five years before suggesting it as an improvement on our well-established and successful system. Meanwhile, we can assure all our critics that there is no sign of breakdown in the co-partnership system of our own or any other gas company. Our co-partners "play the game," in good times and bad.

At the last meeting of the Salford Town Council, a petition was presented signed by 1200 residents in the Seedley district, protesting against the recent increases in the price of gas.

CIRCULATING A FALSE ELECTRICAL STATEMENT.

Correspondence and Withdrawal.

In the "Electricity Supply Memoranda" last week, there was reference to an inaccurate statement made, at a meeting of the Junior Institution of Engineers, by Mr. John F. Shipley, of the Electrical Company, Limited, regarding the poisonous effects of the use of gas-irons in a Luton straw-hat factory. The comment in the "Memoranda" last week showed that Mr. Shipley, after a little hesitancy, had seen fit to withdraw the statement through the columns of "Electrical Industries," which gave it publicity in their leading notes. Those responsible for the interests of the Luton Gas Company regarded the letter published in our contemporary as forming an inadequate withdrawal, and wrote to the Editor to this effect, at the same time asking that the private correspondence with Mr. Shipley should be published. This has been done; and the last letter from that gentleman is found to be much more to the point than the one published in "Electrical Industries" [*ante*, p. 503].

The correspondence is as follows:

To the Editor of "Electrical Industries."

Dear Sir,—The letter which you published in your issue of May 19 from Mr. John F. Shipley, regarding his remarks at the meeting of the Junior Institution of Engineers, as to gas poisonings having taken place at Luton through the use of gas-irons, I consider, says the very least that he could possibly have said in regard to the matter (which, as you will realize, is of immense importance to my Company), and to which matter you gave publicity and further circulation in your comments on April 21. Mr. Shipley's letter to me speaks stronger than the letter he addressed to you; and, in view of the publicity and circulation you gave to his careless assertion, I must ask you to be good enough to publish the letters I addressed to him, together with his replies. I enclose copies of that correspondence.—Yours faithfully,

Gas Company's Office, Luton, May 25, 1915. W. PHILLIPS.

[COPY OF CORRESPONDENCE ENCLOSED.]

Letter from Mr. Phillips to Mr. Shipley—May 10.

Dear Sir,—In the "Electrical Industries" of April 21, I see that the following remarks are attributed to you as having been made at the Junior Institution of Engineers' meeting:

> The discussion did not add very much of value to the paper, but we may note Mr. J. F. Shipley's account of how the installation of 200 gas-irons in a Luton straw hat factory led to ten or twelve cases of gas poisoning daily. It is astonishing that the girls who had thus to be treated in the factory hospital did not realize the true relation between gas fumes and ventilation.

As the publication of a statement of this kind is detrimental and may

"The thanks of the Gas Industry are due to you."

These and many similarly appreciative observations were made by visitors to the

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on the occasion of the Annual Meeting of the Institution of Gas Engineers.

THE DAVIS GAS STOVE Co. Ltd.

be damaging to the interests of my Company, I must ask you to inform me which straw hat factory in Luton experienced this "ten or twelve cases of gas poisoning daily" and on whose authority you have assumed responsibility for giving publicity to such a statement as this. I shall be glad to hear from you as early as possible in regard to this matter, as you will naturally appreciate that a statement of this kind cannot be allowed to go unheeded by my Company.

Reply from Mr. Shipley to Mr. Phillips—May 12, 1915.

Dear Sir,—I am very sorry if any harm has been done to your industry by the report referred to. The matter happened some time ago; and I am not able to discuss it further.

Letter from Mr. Phillips to Mr. Shipley—May 13, 1915.

Dear Sir,—I am in receipt of your letter of the 12th inst., and must ask you for a complete and full retraction of the statement to be at once inserted in the "Electrical Industries;" otherwise I am afraid I shall have to put the matter in the hands of our solicitor.

The Withdrawal and Apology—May 15, 1915.

Dear Sir,—Your letter of the 13th inst. caused me to check the statement I made, and which was reported in the "Electrical Industries." I find that my memory as far as the place is concerned is wrong; and I offer you my deep regrets and a full apology for making such a careless mistake. I have written to the Editor of "Electrical Industries" to correct the error, and also to the Secretary of the Junior Institution of Engineers, by whose invitation I was present at the meeting.

Lighting of Navan Workhouse.—The Navan (co. Meath) Gas Company have offered to instal in the local workhouse a high-pressure gas plant on condition that the Board of Guardians give a contract for three or more years at £160 per annum. The total illumination afforded would be 13,235 candles, which the Company claim would be approximately five times the light received from the present electric plant. As the average price paid by the Board during five years that gas was in use was £190 per annum, the Company consider their offer exceptionally good. The matter remains under consideration.

Dublin Electric Lighting Charges.—A report of the Dublin Corporation Electricity Supply Committee recommends an increase of ½d. all round on the lighting charges and ¼d. on the power rates. Even this, they say, would (as estimated) leave a deficit of £230. On the present basis the Committee estimate a deficit of £21,334. The figures of the March accounts disclose a serious falling-off in consumption, although 800 additional consumers were obtained during the twelve months ended in March. On the entire year's working the drop in units sold amounted to 284,000, and on the estimated income there was a decrease of £8687. The actual drop in financial results as compared with the estimate of 1914 was £8276.

NOTES FROM SCOTLAND.

From Our Own Correspondents.

Saturday.

The Glasgow Corporation Gas Committee have agreed to recommend that the rate within the city supply district for lighting and domestic purposes for gas in quantities up to 500,000 cubic feet be raised from 1s. 11d. to 2s. 6d. per 1000 cubic feet. The charges to other consumers will be raised in proportion. The increase has, of course, been occasioned by the high price of coal.

The accounts of the Dundee Gas Department were submitted to the Town Council last week, and revealed a total revenue of £148,958, while the expenditure had largely increased on account of the higher cost of coal and the drop in the return from residual products. While the electricity revenue has been increased, the expenditure has gone up by a still larger amount, £7500. The proposal is to increase the charge for gas by 7d. per 1000 cubic feet (making the rate 2s. 9d.), and to make the electricity charges 10 per cent. extra for lighting and 15 per cent. extra for power. Of the 7d. increase, it was stated that the price of coal was responsible for 4d., the adverse balance on the past year for 2d., and the war bonuses for 1d. The gas-rental on the year showed a substantial increase; but the returns from residuals were down considerably. Treasurer Soutar remarked that, had it not been for the foresight of the management—and enough credit could not be given to the Engineer (Mr. Alex. Yuill) and the Convener (Mr. Noble)—in tackling the question of coal supplies at the right moment, and covering the requirements of the department, there certainly would have been a very much heavier bill to pay.

At a meeting of the Edinburgh and Leith Gas Commissioners last week, the Engineer (Mr. Alex. Masterton), referring to the restricted lighting of the city, explained that the Commissioners were instructed by the military authorities to do away with lights in those stairs where there were cupolas. This regulation necessitated a considerable reduction in the number of extinguishers and a re-arrangement of the districts covered by the others. There were 90 extinguishers on the staff, and 25 had been dispensed with. The districts of the others had been re-arranged, and their wages had been continued as before. The men who had been dispensed with were casuals; and as far as possible employment was being found for them. The meeting approved of a minute of the Works Committee on the subject of allowances to workmen travelling outside a radius of 2 miles from the Calton Hill. On behalf of the Edinburgh Branch of the National Union of Corporation Workers, it was claimed (1) that the service men be granted the same terms as exist in the gas-fitting department—that the men be allowed to travel both ways in the Commissioners' time when employed outside the radius of 2 miles from the Calton Hill; and (2) that all permanent men in the main-laying department be granted 6d. per day extra when employed outside the radius of 2 miles from the depôt. The Works Committee decided that in all cases of work beyond the city boundary the regular hands should travel one way in the Commissioners' time,

The Silent Gasfire.

A Midland Gas Engineer writes:

"Am very pleased with the unearthly silence of your new gasfire. It must be tested to be believed."

A Southern Gas Engineer writes:

"We fixed a 'RENAISSANCE' fire in our showrooms and it has been very much admired, both for its handsome appearance, its heating effect, and its silent burning."

The "Renaissance."

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Manufacturers of the Silent Gasfire.

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and one way in their own; that the full working day has to be wrought on the job; and the time of travelling is not to be reckoned as overtime. The Commissioners will continue paying car or train fares as at present.

Commenting on a report by Mr. James Dickson (the Manager of the Johnstone Gas-Works), to the effect that the total increase in the gas manufactured during the year ended May 15, as compared with the preceding twelve months, was 10,391,000 cubic feet, the Gas Convener (ex-Provost Armour) said the increase was the largest in the annals of the gas undertaking; and he thought it was particularly gratifying when it was considered that electricity was being used in so many places in the town. The continued progress of the gas undertaking showed that the Council were endeavouring to give the best value possible in the way of gas for cooking and other purposes; and he hoped that the present record would even be surpassed in years to come. The Provost congratulated the Gas Convener upon the excellent report submitted, and expressed the hope that under Mr. Dickson's able management the gas-works would continue to flourish.

At Perth it is proposed to raise the price of gas for the first six months of the financial year from 3s. to 3s. 6d., and for the second half of the year to 4s. per 1000 cubic feet. Should the price of coal decrease, there will be a rebate to consumers.

In the Arbroath Gas-Works, the new retort-bench has shown a profit of over £2000 for 9½ months of the year; and on the year's working, £800 is laid aside to clear off the outlay on erection. Considerable economies have been effected by the working of the new vertical retorts and in other ways.

The Buckie Gas Company are paying a dividend of 5 per cent. on the ordinary shares, and £320 has been written-off for depreciation. The sale of gas shows an increase over the previous year of about half-a-million cubic feet; and the works, which have been put into good order, will supply the needs of the town for a considerable time.

By a fire which broke out last Sunday week, the gas engineering works at Paisley of Messrs. Hanna, Donald, and Wilson sustained damage estimated to amount to £3000. The conflagration started in a pattern shop, which was stocked with valuable patterns; and when the firemen arrived, the building, which was of wood, was a mass of flames. Subsequently the fire extended to another pattern shop; and both buildings, with their contents, were destroyed.

The Coatbridge Gas Company have refused to grant the workers certain conditions in the shape of a war bonus. Notices were lodged, and on their expiry the men left; but other stokers were obtained.

Increase at Swansea.—The Swansea Gas Company have notified an increase in the price of gas to 3s. 6d. per 1000 cubic feet to householders. The Corporation pay 2s. 6d. per 1000 cubic feet for street lighting. At a meeting of the Highways Committee last Wednesday, it was reported that the enhanced price of gas involved a total increase in cost of £665 10s. per annum, and against this would be placed £180 to £200 saved by reduced lighting owing to the war.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *June 5.*

The market for pitch is inactive, but the price is nominally 26s. per ton, in bulk, at makers' works. Tar spirits continue in good demand. Creosote is firm at 4¼d. to 4½d. per gallon net, in bulk, at makers' works. Sixties crude carbolic acid remains steady at the price last reported—viz., 3s. 6d. to 3s. 7½d. per gallon, casks free.

There is plenty of inquiry for sulphate of ammonia for delivery right through to the middle of next year, and makers are optimistic as to the course of the market. The present value for any position may be called £13 10s. per ton net, and naked, at makers' works, for 25 per cent. quality.

*** Through a printer's error in last week's report, the quotation for anthracene was given as 30 per cent. quality instead of 40 per cent.

Tar Products in the Provinces.

June 7.

Markets for tar products have remained very firm throughout the past week. The demand for pitch is steady, and the price keeps firm. Creosote is very quiet and difficult to sell. Solvent and heavy naphthas are in good demand. Any parcel of crude carbolic that comes on to the market is eagerly competed for.

The average values of gas-works products during the past week were: Gas-works coal tar, 22s. 9d. to 26s. 9d. Pitch, East Coast, 22s. to 23s. per ton; Norfolk, Suffolk, and Humber ports, 19s. to 20s.; West Coast, 20s. to 21s. Manchester; 21s. to 21s. 6d. Liverpool; 23s. to 24s. Clyde. Benzol, 90 per cent., naked, North, 10½d. to 11d.; 50-90 per cent., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 2d. to 2s. 4d. Crude naphtha, in bulk, North, 6d. to 6½d. Solvent naphtha, naked, North, 1s. 10d. to 1s. 11d. Heavy naphtha, naked, North, 1s. 2d. to 1s. 3d. Creosote, in bulk, North, 3d. to 3⅛d. Heavy oils, in bulk, 3⅝d. to 4d. Carbolic acid, casks included, 60 per cent., East and West Coasts, 3s. 6d. Naphthalene, £8 to £16; salts, 75s. to 80s., bags included. Anthracene, "A" quality, 2d. per unit; "B" quality, nominally ¾d.

Sulphate of Ammonia in the Provinces.

LIVERPOOL, *June 5.*

During the past week there has not been any further gain in the value of this article, but there has been no sign of any reaction setting in, and all available supplies have continued to be absorbed at full prices. The closing quotations are still £13s. 17s. 6d. per ton f.o.b. Hull, £13s. 18s. 9d. per ton f.o.b. Liverpool, and £14 2s. 6d. per ton f.o b. Leith. Although some manufacturers are now holding for more money in the forward position, the highest figures reported as having

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SYSTEM

Of Burning Gaseous Fuel.

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COMPRISE THE APPLICATION OF TWO MAIN PRINCIPLES.

(I) Downward displacement of flues.
(II) A constant ratio between the pressures of two (or more) elastic fluids when brought together for the purpose of combustion.

WHEN APPLIED TO CRUCIBLE FURNACES.

The economy of gas has been demonstrated to be 50 per cent., and more, over those in general use. In the case of 70/30 brass, the consumption is 2 c' per lb.

WHEN PRINCIPLE II IS APPLIED TO LIGHTING

50-candle power and more is obtainable at low pressure per cubic foot.

WHEN BOTH PRINCIPLES ARE APPLIED TO WATER HEATING

A 97 per cent. efficiency has been obtained.

PRICE LIST.

Pressure balance for ¾-inch gas-main . £10 or quarterly rent of . 10s.
" 1½ " " . £20 " " . 20s.
" 3 " " . £40 " " . 40s.

For sizes above, by arrangement, either on a basis of half economy or by a predetermined arrangement on the basis of the amount of gas consumed in three preceding years.

PRICE OF BRASS MELTING FURNACES.
4s. to 7s. per lb. capacity according to the quality of fire-clay used.

PRICE FOR STREET LIGHTING.
By arrangement on a basis of the amount economized.

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actually been paid are £14 2s. 6d. per ton for July-December delivery this year, and £14 5s. for January-June next year, f.o.b. good ports in equal monthly quantities.

Nitrate of Soda.

The market for this material is again easier, and the values on spot are to-day 12s. 3d. per cwt. for ordinary quality, and 12s. 6d. for refined.

Sulphate of Ammonia.

From another source it is reported that this market still remains firm, and business for the forward position is reported at fairly good prices. Outside London, makes are quoted at £13 to £13 2s. 6d.; Hull, £13 15s.; Leith, £14 to £14 2s. 6d.; Liverpool, £13 17s. 6d.; Middlesbrough, £13 15s. to £13 17s. 6d.

COAL TRADE REPORT.

Northern Coal Trade.

The coal trade is quieter, chiefly owing to the difficulty of obtaining licences for the exports to neutral countries, such as Sweden. The refusal of a licence for a cargo throws it on to the market, or causes a colliery some idle time. On the whole, however, the output is well taken up. In steam coals, best Northumbrians are from 23s. to 23s. 6d. per ton f.o.b.; second-class steams are about 19s. per ton; and steam smalls from 15s. to 17s. per ton f.o.b., according to quality. But while these prices are high, it will be borne in mind that the wages of the miners now bear the war-bonus addition of 15 per cent. In the gas coal trade, the demand is generally good, and the shipments are full, especially to the South of England and to France; freights being now a little easier generally. For best Durham gas coal, about 22s. to 22s. 6d. per ton f.o.b. is now the current quotation; second-class gas coals are quiet at 21s. per ton; and for "Wear Specials," the tone is steady at 24s. per ton f.o.b. There are no large contracts reported just now; but those for the Darlington Corporation are concluded, at a sharp advance, though the exact figures have not been made public yet. Home consumption of gas coals is now reduced considerably, both by military orders and by the long days; but stocks are being added to. The coke market is steady; and, with gas coke in smaller production, the price is firm. Good gas coke is from 19s. to 20s. per ton f.o.b, and exports are fairly good.

The Mexboro' and Swinton Joint Gas Board have decided to increase the price of gas by 6d. per 1000 cubic feet; and it is believed that even this will hardly meet the increase in cost of production.

The Rochdale Gas Committee have arranged for the purchase of 40,000 tons of coal at an average increase in price of 5s. 11d. per ton (5s. 10d. for coal and 1d. for cartage). On the 40,000 tons the advance represents £11,888.

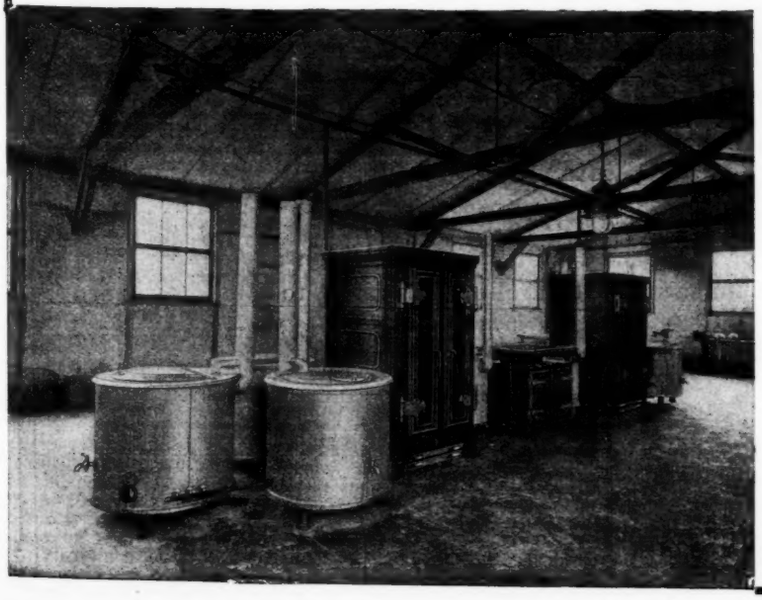
Rochdale Corporation Gas Department.

The annual report of the Rochdale Corporation Gas Committee states that the financial year has been a period of exceptional difficulty and anxiety. The difficulty in securing adequate supplies of coal during the winter months resulted in such a depletion of stocks as to jeopardize the continuous supply of gas if any prolonged interruption of traffic had occurred. The Committee have recently been able to add to the coal in stock, and will use every endeavour to make adequate provision for the demands of next winter. The very serious increase in the price of coal (amounting approximately on the year's consumption to about £18,000) will, however, necessitate an early revision of the gas charges. The Committee state that while the quantity of gas sold during last year was practically the same as in the preceding year, it is due to increased sales for purposes other than lighting. This is attributable very largely to the useful work accomplished by the show-rooms; for, whereas the gas used for lighting purposes shows a decrease of 15½ millions due to the restriction of lighting, both public and private, the gas used for purposes other than lighting shows an increase of 18¾ millions, and now represents over 33 per cent. of the total quantity sold to private consumers. The revenue from gas showed an increase of £807, apart from prepayment meters, which yielded £478 less than in the previous year, although there were 250 more in use. Increased distribution charges have been incurred in the free fixing of gas cookers, meters, &c., in pursuance of the policy sanctioned by the Council two years ago, and £1949 represents the amounts paid to various plumbers for this service. To this must be added £600, representing the hiring rates for meters, which have been abolished in all cases where a second meter is required, and the reduction in cooker rentals.

Meter Renting v. Purchasing.—The Finance Committee of the Kensington Borough Council have considered whether it would be advantageous to the Council to purchase meters used in connection with street lighting and the Council's properties, instead of renting them as at the present time. The Committee had before them a list of the whole of the gas and electricity meters used by the Council, together with information as to the rentals now paid, and the cost of purchasing new meters in place thereof. The Committee have satisfied themselves that no financial advantage would accrue to the Council by departing from the present system, under which the necessary meters for registering supplies are rented for this purpose. In connection with the consideration of the matter, however, the Committee have had their attention called to certain cases in which meters may be dispensed with or smaller ones substituted, thereby reducing the amount paid for rentals; and the Committee have taken steps to secure such reduction being, if possible, secured. The Committee mention that they have given instructions for check meters to be provided for indicating the consumption of gas and electricity of the houses or quarters occupied by servants of the Council in connection with properties controlled by the Committee.

ONE OF FIVE

COOKHOUSES AT "KITCHENER'S CAMP," EASTBOURNE,



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Gas Matters at Shipley.

In presenting at last week's meeting of the Shipley Urban District Council a financial statement with regard to the gas undertaking, Mr. A. Waugh said that the position caused by the war was a very unfortunate one. Prices of coal and other commodities had gone up, while the income from residuals had gone down considerably. The result was that the Gas Committee were called upon to provide for an additional sum of £5208. The only source from which to meet the deficit was the rates. It would require an increase of 7d. per 1000 cubic feet to raise the sum he had named; and the Committee felt compelled to raise the price of gas, as from July 1, from 3s. 4d. to 3s 9d. per 1000 cubic feet, with an allowance of 2d. for prompt payment, against the present allowance of 4d. He proposed the adoption of this new rate of charge. Mr. Pitts asked if it was not possible to adopt some different method of meeting the deficit. He was convinced that the increased price would not bring in the needed income, because less gas would be consumed. The Chairman replied that the only other way was to make up the difference out of the rates, which would not be fair. The resolution was adopted.

Dearer Gas at Leeds.

The proposal already reported to increase the price of gas 3d. per 1000 cubic feet to all consumers for lighting, cooking, and heating, as from July 1, came before the Leeds City Council last Wednesday, when it was adopted by a substantial majority. The recommendation was made in consequence of the increased cost of manufacture, and having regard to the deficit on the undertaking. Mr. Alderman W. Penrose Green (the Chairman of the Gas Committee) said that for the year ended March 31, 1913, the department made a profit of £24,727, which went to the relief of the rates. The following year they estimated for a profit of £20,000; but the strike ensued and resulted in a deficiency of £16,000. The strike cost the department £33,000. During the last year, there had been war conditions, which had resulted in decreased revenue from the sale of gas and bye-products, and an increased expenditure of £5000 in war bonuses, making a deficiency of £23,957. No one could tell what the price of coal would reach; and though the Committee had bought well up to the present, when they again advertised for coal they might have to pay very much more. Other towns in England had advanced the price from 2d. to 10d. per 1000 cubic feet; and in suggesting an increase of 3d. in Leeds they considered that, if anything, they were erring on the light side. Mr. Fountain questioned whether the war was entirely the factor so far as the state of the department was concerned, and said he was rather of the opinion that the past policy of making no provision to meet a deficiency, and expending the profits as they had done for a number of years, had brought about the present situation. Now the Committee came along and asked the working classes, already heavily taxed, to pay more for what was an expensive luxury.

Coal and Gas Prices at Wallasey.

When the recommendation of the Gas Committee, that the price of gas be increased from 2s. to 2s. 4d. per 1000 cubic feet to ordinary consumers and *pro ratâ* to power consumers, and that the rebate to slot-meter users be discontinued [*ante*, p. 527], came again before the Wallasey Town Council last Thursday, Mr. Nelson proposed that, instead of the rebate of 2d. in the shilling for slot-meters being discontinued, a rebate of 1d. be allowed. His anxiety was that an excessive charge should not fall upon the persons least able to bear it. There were 8830 slot-meter consumers, mostly in the poorer wards of the borough; and if the recommendation of the Committee was confirmed these people were going to be the most hardly hit, because the increased charge to them would be 5d. instead of 4d. per 1000 cubic feet. A rebate of 1d. would mean that slot-meter users would be paying 2s. 6½d. per 1000 cubic feet. Instead of the amendment he had already moved, he would therefore propose that the charge be one which would make the rate equal to that paid by ordinary consumers. The Vice-Chairman of the Committee (Mr. Evans) said they were face to face with the fact that they had to pay £18,000 more for coal, and everybody must bear his fair share. If the rates were to be increased, it would be a disastrous thing to the community. The proposed increase of the gas charges was not a serious matter, because their gas even then would be much cheaper than in most other towns. He would point out that there were extra expenses incurred in connection with the slot-meters. Dr. M'Millan said the point was that the money had to be found; and it was a question whether the gas consumer or the ratepayer should find it. If people were coming into the borough they did not ask what was the charge for gas, but how much was the rate in the pound. Alderman Dawson said the Committee were convinced, after careful consideration, that they were doing the fair thing to all concerned by what they proposed. In fact, a slight concession was actually being made to the slot-meter consumer. The system of rebate had been devised in order to avoid the expense of altering the index wheels whenever the price of gas was changed. Mr. Eastwood, in supporting the amendment, said he objected to the price of gas being increased at all. He thought they were making a mistake in buying coal for twelve months ahead. The amendment was defeated; only six members of the Council supporting it. A further amendment by Alderman Farley, that, in order to facilitate the adjustment of charges, the increase for power gas should be at the rate of 15 per cent., was agreed to; and the minutes were then confirmed.

Belfast Gas-Coal Contracts.—At a meeting of the Belfast Corporation, Alderman Craig, on behalf of the Gas Committee, said, in regard to the tenders for coal for the ensuing year, the contract prices showed an average advance of 7s. 6d. a ton all round upon last year's prices. Mr. Squire said this meant an additional sum for the year of £30,000. The prices ranged from 23s. 6d. to 25s. 7d.

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